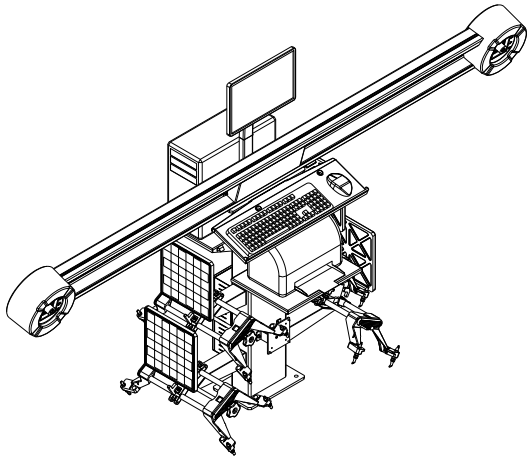# 3D WHEEL ALIGNER
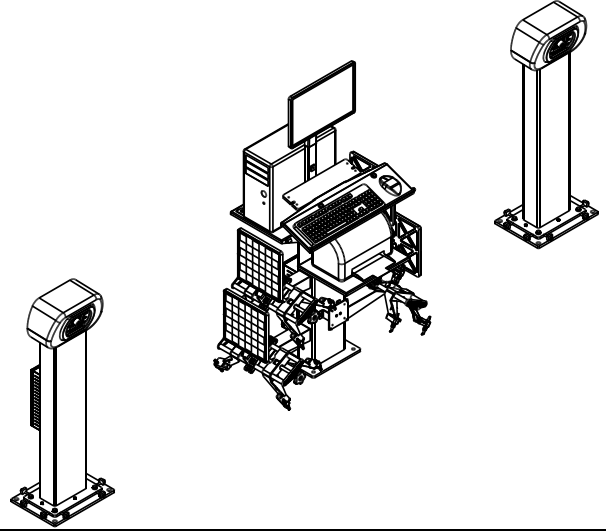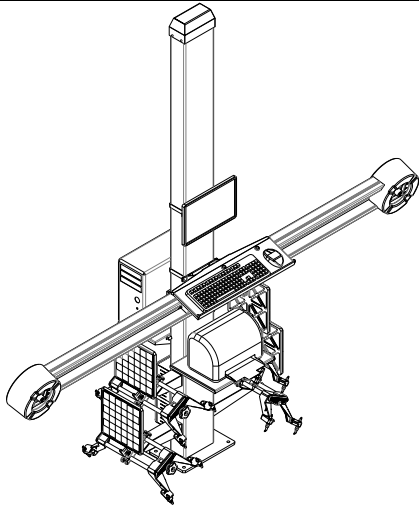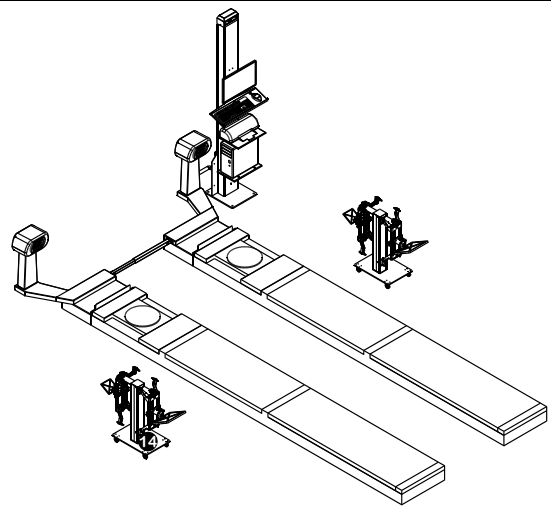
PIT (PT) model

DRIVE THROUGH (DT) model

VARIABLE HEIGHT (VH) model

IN-LIFT model

AUTOMATIC VARIABLE HEIGHT (AutoBoom) model

With Cabinet
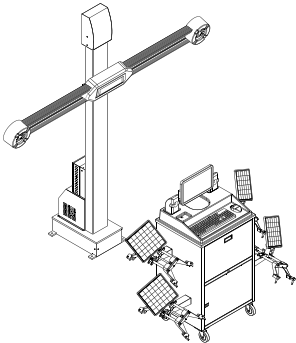
AutoBoom

AutoBoom X
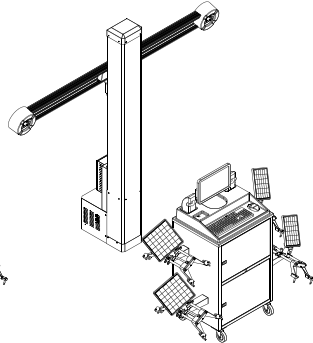
AutoBoom V4
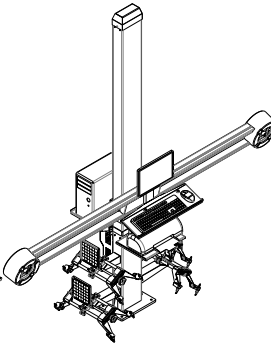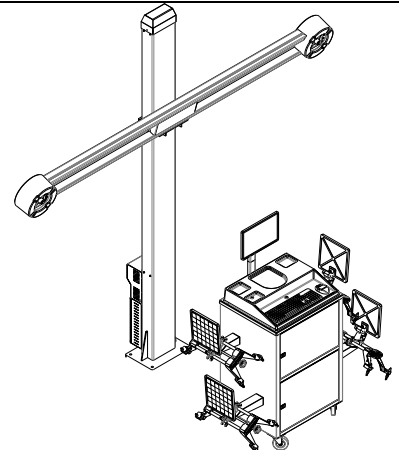
SERVICE MANUAL
(Ver.1.8)

INDEX

1. WARRANTY – STATUTORY CLAUSE

The equipment is provided with Warranty for one year from the date of installation or thirteen months from the date of despatch whichever is earlier, against any manufacturing defect. The Warranty is subjected to the following conditions:

1. Ensure that proper power supply with protective Earthing is provided to the equipment through uninterruptible Power Supply (UPS). Any high voltage may damage the components, leading to system failure or electrical hazards.
   Power supply:
   230V operation: Single Phase, 230V AC ± 10%, 50 Hz + N + PE (or)
   110V operation: Single Phase, 110V AC ± 10%, 60 Hz + N + PE
   110V operation: For Automatic Variable Height (AVH) model – Single Phase, 110V AC ± 10%, 60 Hz + N + PE
   (The Potential difference between N – Neutral & PE - Protective Earth should be below 3V)
   Laser printer should be connected in a separate power supply. Machine power socket should not be used for this purpose
   Warranty ceases if this condition is not satisfied

2. Power supply to the equipment should be connected only through a CVT of 1KVA capacity and then through an UPS of minimum 1KVA capacity with AVR (Automatic Voltage Regulator) circuit. The system must be shut down before the UPS power trip OFF. Failing to comply may lead to software corruption.
   Warranty ceases if this condition is not satisfied

3. Do not attempt to open or service the equipment under any circumstances by un-authorised personnel. Risk of electric shock may happen. Only authorised / qualified service personnel should trouble shoot the equipment.
   Warranty ceases if the equipment is opened/tampered or serviced by un-authorised personnel

4. *Warranty ceases if this equipment is used for any purpose other than intended use.*

5. The equipment must be installed Indoor away from Sunlight, rain / moist areas
   Warranty ceases if the equipment is exposed to direct Sunlight, Rain / Water

6. Do not attempt to load any other Application software (Audio, Video etc.) under any circumstances, other than the alignment program loaded in the Factory.
   Warranty ceases if the system is loaded with any other Application software

7. If transportation, lifting, unpacking, installation, assembly, start up, testing, repair and maintenance have been performed by un-authorised personnel, the manufacturer shall not be responsible for injury to personnel or damage to objects.

8. DO NOT remove or modify any parts of the equipment as this could compromise the equipment's intended use. For any modifications / repairs consult the Manufacturer.

9. The Vehicle specification data must be entered by End user only. **MANUFACTURER IS NOT RESPONSIBLE FOR ANY INCORRECT OR INCOMPLETE VEHICLE SPECIFICATIONS ENTERED INTO THE SYSTEM**. No claim is entertained for any damage or loss.

10. Follow the Alignment lift manufacturer's safety recommendations when lifting a vehicle. **MANUFACTURER IS NOT LIABLE FOR ANY DAMAGES CAUSED due to non-compliance**

11. Make the warranty registration by duly signing the counterfoil of the Warranty card sent along with the equipment.

Manufacturer does not warrant third party products / software added to our Wheel aligner through our Factory integration system. The below listed Third party products / peripherals / software are covered under the warranties provided by the respective OEM. Third party manufacturer's warranty may vary from product to product. Consult the respective product documentation for warranty information:

1. Desktop computer with Monitor
2. Printer
3. Keyboard
4. Mouse
5. Multimedia speakers
6. Operating system software

2. INSTALLATION REQUIREMENTS

Wheel aligner installation should be done only by qualified Service personnel.

Before attempting installation, read these instructions thoroughly and understand the tasks involved. Review all the requirements of installation to avoid oversights resulting in revenue loss, and lost customer confidence.

Ensure the environment is conducive for optimum performance of imaging alignment.

3D Wheel aligner can be installed as conventional wheel aligners; however there are unique considerations which must be addressed. 3D Wheel aligner normally requires zero offset calibration at the installation place.

| | **Provision of handling means such as Forklifts etc. is the owner's responsibility** |

- ➢ Procure the necessary tools to do a quality job
- ➢ Perform the installation safely by observing all precautions associated with the task at hand.
- ➢ Ensure that the Rack/Lift is safe and the lock mechanisms are secured. Check runways are co-planar at all heights & it is relatively leveled for ease of push-Pull Runout. Check the Turn tables are free from binding and rotates freely.
- ➢ The following accessories and tools are required for the proper installation of the equipment:
  - ❖ Screw drivers, Spanner set and Allen key set
  - ❖ Measurement Tape – 5 metre
  - ❖ Marker / Chalk liner - for marking
  - ❖ 0° Sprit Level
  - ❖ Strip cutter - to Open Carton Banding
  - ❖ knife – for opening Cartons
  - ❖ Plastic cable Ties – for proper routing of cables
  - ❖ Multi-meter – for verifying supply voltage
  - ❖ 0.5kg. Hammer - Set Anchor Bolts
  - ❖ Hammer Drill and 12mm Drill bit
  - ❖ Calibration kit
  - ❖ Glass Cleaner(Cleaning agent) - for cleaning Targets after installation, if necessary
  - ❖ Adjustable Wrench
  - ❖ Instruction stickers
  - ❖ Pendulums – 2 Nos.
  - ❖ Water tube level -5meter
  - ❖ Shims (required quantities) – 0.5mmT, 1.0mmT, 1.5mmT & 2.0mmT

2.1. POWER REQUIREMENT

Stabilised (AVR) UPS 230V AC ± 10%, 1φ, 50 Hz + N + PE   (or)

Stabilised (AVR) UPS 110V AC ± 10%, 1φ, 60 Hz + N + PE for 110V operation

Stabilised (AVR) UPS 110VAC ±10%, Single Phase, 60Hz +N +PE (For AVH model)

Supply should be connected only through a CVT of 1KVA capacity and then through an UPS of minimum 1KVA capacity with AVR (Automatic Voltage Regulator) circuit using a CE certified Two Pole, Type C, 6A MCB (For AVH 110V model, Two pole, Type C, 10A MCB). Proper Earthing must be provided. Also ensure that Live phase is on the right side point of the wall socket.

Neutral to Line Voltage should be 230V AC ±10% (or) 110V AC ±10%
Line to Earth voltage should be 230V AC ±10% (or) 110V AC ±10%
Neutral to Earth leakage should be less than 3V AC
It is strongly recommended to use CVT & UPS (with AVR) for the aligner. Printer should not be connected to UPS & separate power supply to be made.

2.2. SPACE REQUIREMENTS

- Installation area should have roof. The front space from the wall to the rotary plate is 3.5 meter.
- Floor should be of good concrete flooring and should be leveled surface.
- Ensure that the floor adequately supports the Rack / Rail to withstand vehicle load. Ensure the Turn table plate pits are leveled & Rear wheel sliders are properly seated.

👉	**Proof of safe floor load capacity is the owner's responsibility**

- The clearances from side walls and roof should be adequate for the operator to move around and perform wheel alignment / maintenance.
- Alignment can be carried out either on Alignment pit or using Alignment lift.

👉	**Choice of suitable alignment platform is the owner's responsibility**

2.2.1. ALIGNMENT PIT DIMENSIONS (Applicable only for PT / VH / Wall mount models)

👉	**In case of Pit model, the Rotary plate top surface and Vertical column base resting surface should be equal**

Pit for Rotary plates and Rear wheel sliders are necessary to carry out alignment. Both the pits should be in the same plane. However the main pit is intended only for the operator to go underneath the vehicle easily and carryout the required corrections. The length of the main pit can be made depending upon the availability of space. The Rotary plate / Slider plate locating pit can be finished with Granite or Marble purely by owner's choice.

👉	**Slider & its pit are not necessary for Heavy Commercial Vehicles (HCV). However alignment pit with provision for Slider placement can be used for alignment of Light Commercial Vehicle (LCV) using the same pit**

👉	**Choice of finish of pit is the owner's responsibility**

A Rail using MS flat (50 mm x12 mm) for Trolley should be partly embedded on the edge of main pit with 15mm height from floor level. This is required for placing the Jack over the moving trolley platform to lift the vehicle while carrying out Runout. A centralised single Hydraulic jack or Dual pneumatic jack is recommended.

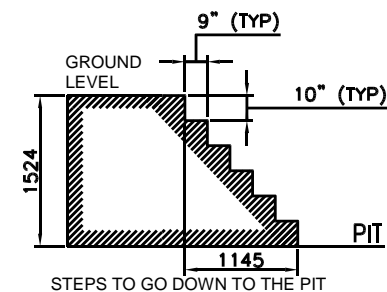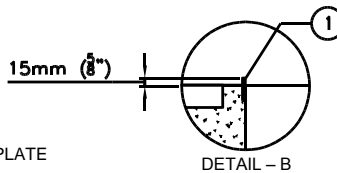| 👉	**The floor level between the Left and Right rotary plate pits should be same. The area adjoining the Main pit (except Rotary plate & Slider pits) should be maintained at even level**

The surface over which Rotary plates are kept must be perfectly leveled using Spirit level. Also, perfect leveling must be ensured on both the sides of pit. Otherwise it will affect the alignment results.

PIT DIMENSIONS – Max. Wheel base – 3.2 & 4metre (For PT model)

OVERALL PIT DIMENSIONS (19' x 12')
LENGTH : 5795 (19')
WIDTH : 3660 (12')

SECTION – AA

DETAIL – B

15mm ($\frac{5}{8}$")

9" (TYP)

GROUND LEVEL

10" (TYP)

1524

PIT

1145

STEPS TO GO DOWN TO THE PIT

SlNo	Description
1.	RAIL FOR TROLLEY – 50x12mm (2'x½') - MAT'L: M.S FLAT THE RAIL SHOULD BE PARTLY EMBEDDED IN THE GROUND THE HEIGHT OF THE RAIL FROM THE FLOOR LEVEL SHOULD BE 15mm (5/8")
2.	STEPS TO GO DOWN TO THE PIT
3.	PIT DEPTH – 1524mm (5')

ROTARY PLATE
DEPTH: 50mm

ROTARY PLATE
DEPTH: 50mm

ROTARY PLATE CENTRE

LONGER SLIDER
DEPTH: 50mm
#

LONGER SLIDER
DEPTH: 50mm
#

3660 (12')

FRONT WHEEL

REAR WHEEL
MIN. WHEEL BASE

REAR WHEEL
MAX. WHEEL BASE

ø991(39")

ø508(20")

CAMERA DISTANCE

WHEEL BASE

WHEEL BASE TABLE:

MAX. WHEEL BASE	SLIDER SIZE	OVERALL PIT DIMN. LENGTH	OVERALL PIT DIMN WIDTH
3200	1500x750	5795 (19')	3360 (12')
4000	2400x750	6710 (22')	3360 (12')

LEVEL THE RECESSES OF BOTH ROTARY PLATE & SLIDER

LEVEL THE PIT DIAGONALLY

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. 4m WHEEL BASE PIT DIMN REF. WHEEL BASE TABLE
4. AFTER PLACING THE LONGER SLIDER (1500mm LENGTH) IN THE # INDICATED 2400mm LENGTH RECESS, REMAINING 900mm LENGTH HAS TO BE FILLED BY METAL SPACER (875x600x50)
5. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE

Fig. 1

PIT DIMENSIONS – Max. Wheel base – 3.2 & 4metre (For DT model)

OVERALL PIT DIMENSIONS (19'x12')
LENGTH : 5795 (19')
WIDTH : 3660 (12')

486
56
50
2420
760
735
361
1136
CAMERA CENTER LINE

(2000–2400)*
1085
Steps to go to pit
Down to pit

850
850
530
265
265
ROTARY PLATE
DEPTH: 50mm
ROTARY PLATE
DEPTH: 50mm
ROTARY PLATE CENTER

60
60

5786 (19')
'A'
'A'
4650
1435

750
750

1500
LONGER SLIDER
DEPTH : 50mm
#
LONGER SLIDER
DEPTH : 50mm
#

3660 (12')

SPACE INDICATED FOR SLIDER
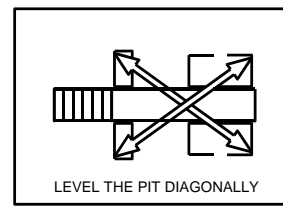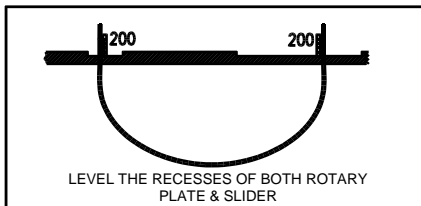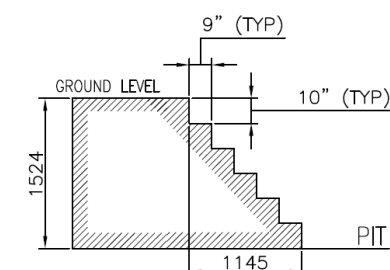IN HIDDEN LINE IS OPTIONAL

SPRIT LEVEL
SQUARE
'B'
STRAIGHT FLAT
2
SECTION – AA

15mm (⅝")
1
DETAIL – B

9" (TYP)
GROUND LEVEL
10" (TYP)
1524
PIT
1145
STEPS TO GO DOWN TO THE PIT.

SL.NO	DESCRIPTION
1	RAIL FOR TROLLEY – 50X12 mm (2'x1/2') –MATERIAL : M.S FLAT {THE RAIL SHOULD BE PARTLY EMBEDDED IN THE GROUND. THE HEIGHT OF THE RAIL FROM THE FLOOR LEVEL SHOULD BE 15 mm (5/8")}
2	STEPS TO GO DOWN TO THE PIT.
3	PIT DEPTH – 1524 mm (5')

FRONT WHEEL
REAR WHEEL
MIN.WHEEL BASE
REAR WHEEL
MAX.WHEEL BASE
ø991(39")
ø508(20")
1000
385
625
2000
2056
1700
1500

WHEEL BASE TABLE:

MAX. WHEEL BASE	SLIDER SIZE	OVERALL PIT DIM. LENGTH	OVERALL PIT DIM. WIDTH
3200	1500x750	5795 (19')	3360 (12')
4000	2400x750	6710 (22')	3360 (12')

WATER LEVEL TUBE
200
200
LEVEL THE RECESSES OF BOTH ROTARY PLATE & SLIDER

LEVEL THE PIT DIAGONALLY

NOTE:
1. U.O.S. ALL DIMENSIONS ARE IN mm.
2. LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
3. 4METER WHEEL BASE PIT DIM REF. WHEEL BASE TABLE.
4. AFTER PLACING THE LONGER SLIDER (1500mm LENGTH) IN THE # INDICATED 2400mm LENGTH RECESS, THE REMAINING 900mm LENGTH HAS TO BE FILLED BY METAL SPACER (875x600x50).
5. ★ DISTANCE BETWEEN THE CAMERA AND TURN TABLE CAN BE ALTERED FROM 2000mm TO 2400mm BASED ON THE AVAILABILITY OF SPACE.
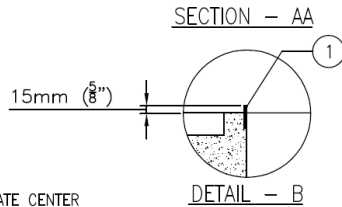
Fig. 2

☞ **Set the verticality of Camera mounted Vertical columns using Jack screws provided in the Master base plate**
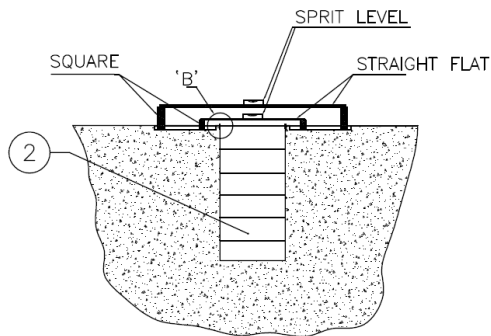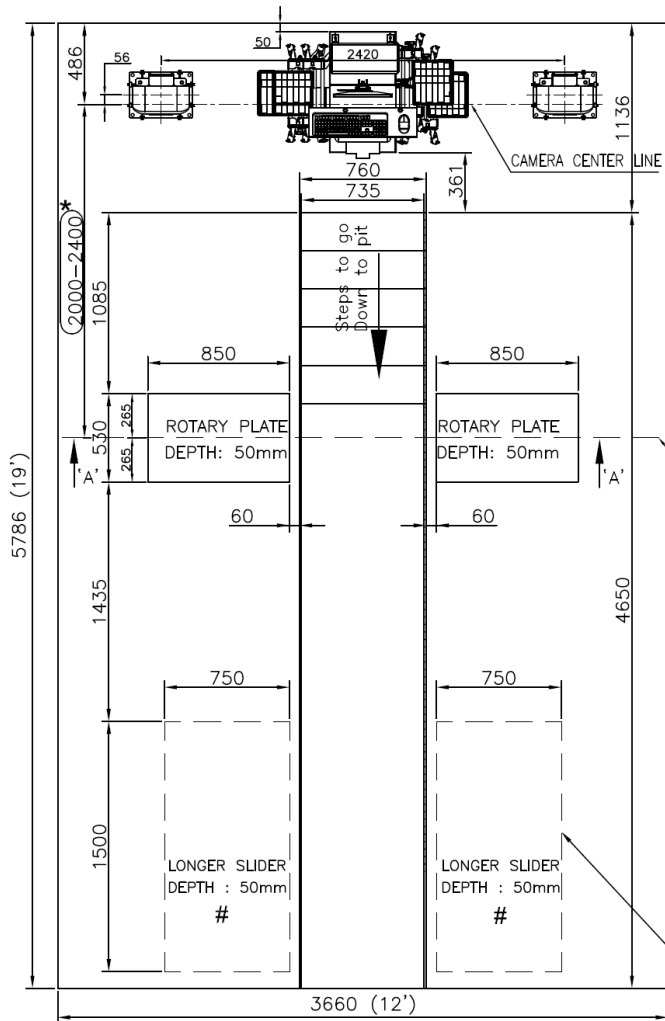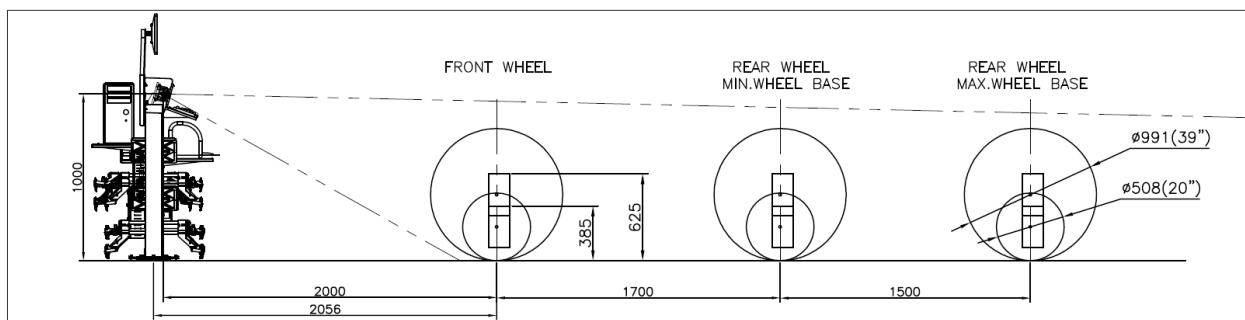
PIT DIMENSIONS – Max. Wheel base – 3.2 & 4metre (For VH model)

OVERALL FOUR POST LIFT DIMENSIONS (19.1'x12')
LENGTH : 5830 (19.1')
WIDTH : 3660 (12')

SECTION – AA

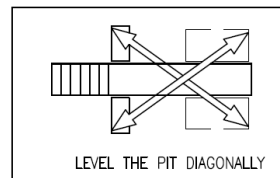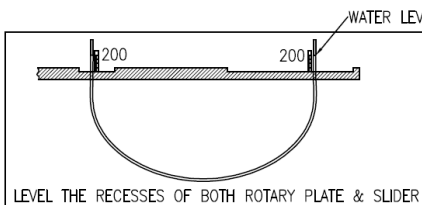DETAIL – B

STEPS TO GO DOWN TO THE PIT.

SL.NO	DESCRIPTION
1	RAIL FOR TROLLEY – 50X12 mm (2'x1/2') –MATERIAL : M.S FLAT {THE RAIL SHOULD BE PARTLY EMBEDDED IN THE GROUND. THE HEIGHT OF THE RAIL FROM THE FLOOR LEVEL SHOULD BE 15 mm (5/8")}
2	STEPS TO GO DOWN TO THE PIT.
3	PIT DEPTH – 1524 mm (5')

SPACE INDICATED FOR SLIDER
IN HIDDEN LINE IS OPTIONAL

ROTARY PLATE DEPTH: 50mm
LONGER SLIDER DEPTH : 50mm
ROTARY PLATE CENTER

Steps to go to pit / Down to pit

WHEEL BASE (WB)
CAMERA DISTANCE (D)
CAMERA HEIGHT(H)

FRONT WHEEL
REAR WHEEL MIN.WHEEL BASE
REAR WHEEL MAX.WHEEL BASE
ø991(39")
ø508(20")

WHEEL BASE TABLE

MAX. WHEEL BASE	SLIDER SIZE	OVERALL PIT DIM. LENGTH	OVERALL PIT DIM. WIDTH
3200	1500x750	5830 (19.1')	3360 (12')
4000	2400x750	6740 (22.1')	3360 (12')
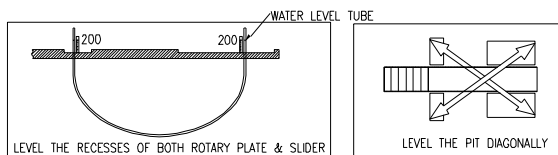
CAMERA VARIABLE HEIGHT FIXING AND DISTANCE

TILT ANGLE	CAMERA HEIGHT	CAMERA TO ROTARY PLATE	WHEEL BASE
15	1000	2000	4200
	1300	2300	3900
	1600	2800	3400

WATER LEVEL TUBE

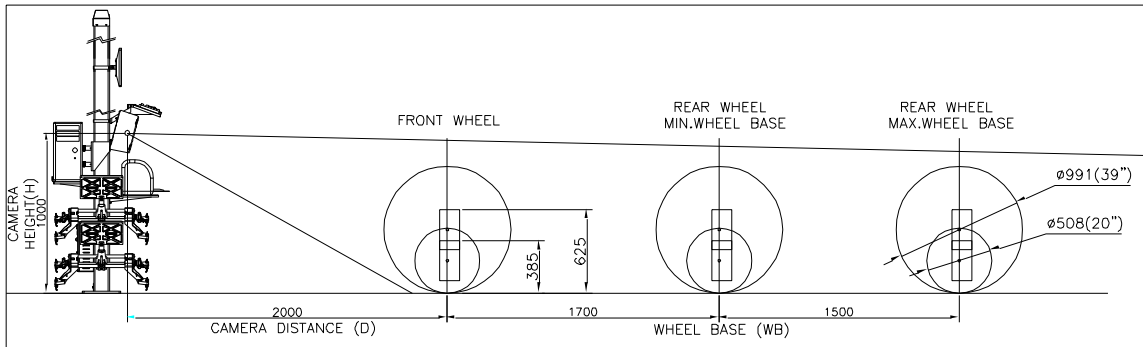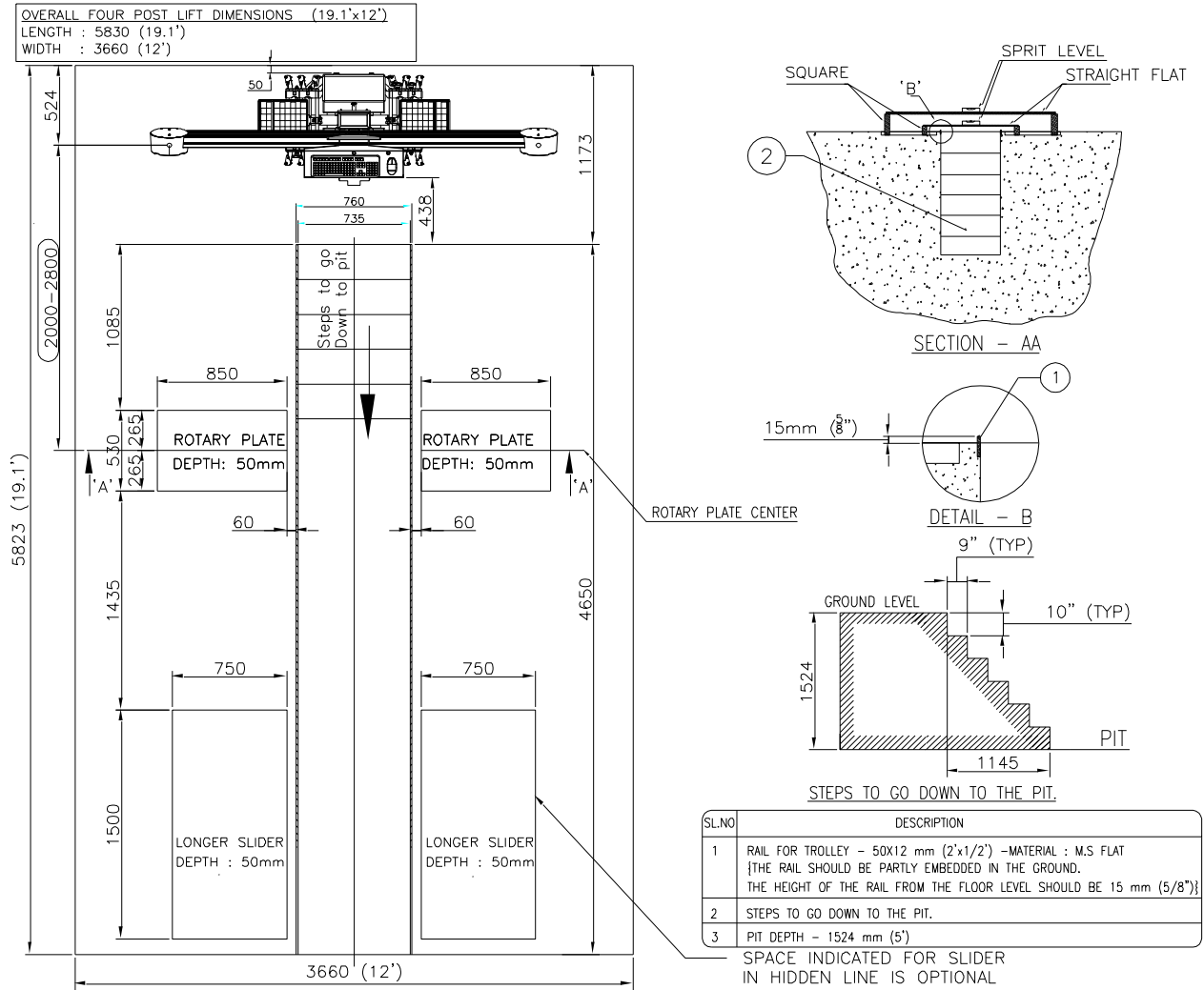LEVEL THE RECESSES OF BOTH ROTARY PLATE & SLIDER

LEVEL THE PIT DIAGONALLY

NOTE:
1. U.O.S. ALL DIMENSIONS ARE IN mm.
2. LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
3. 4METER WHEEL BASE PIT DIM REF. WHEEL BASE TABLE.
4. AFTER PLACING THE LONGER SLIDER (1500mm LENGTH)
   IN THE INDICATED 2400mm LENGTH RECESS, THE REMAINING 900mm
   LENGTH HAS TO BE FILLED BY METAL SPACER (875x600x50).
5. DISTANCE BETWEEN THE CAMERA AND TURN TABLE CAN BE ALTERED
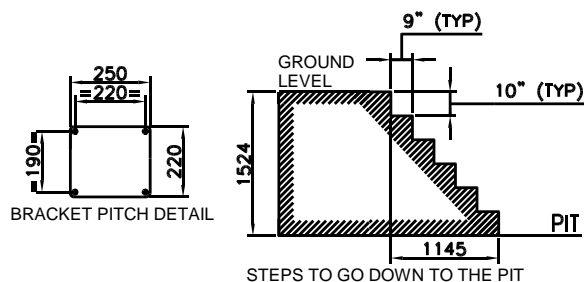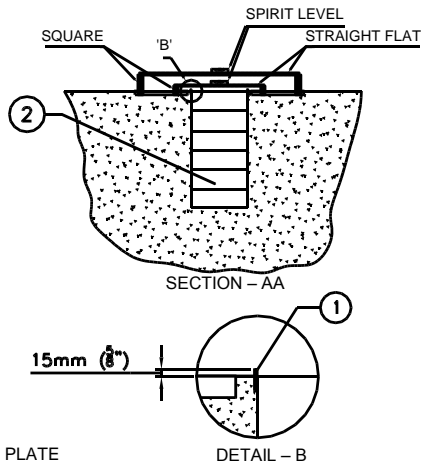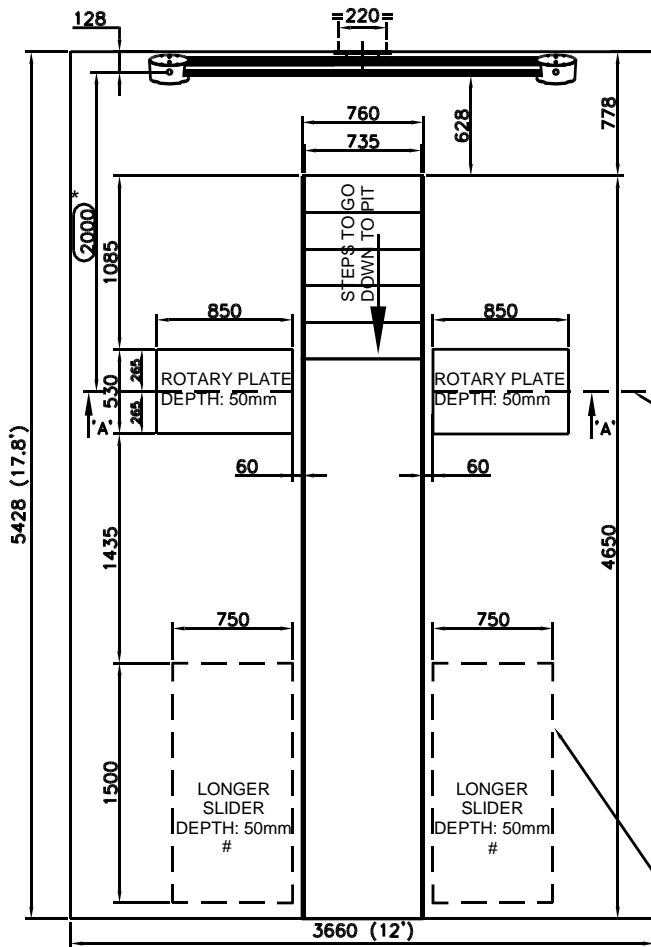   FROM 2000mm TO 2800mm BASED ON THE AVAILABILITY OF SPACE.
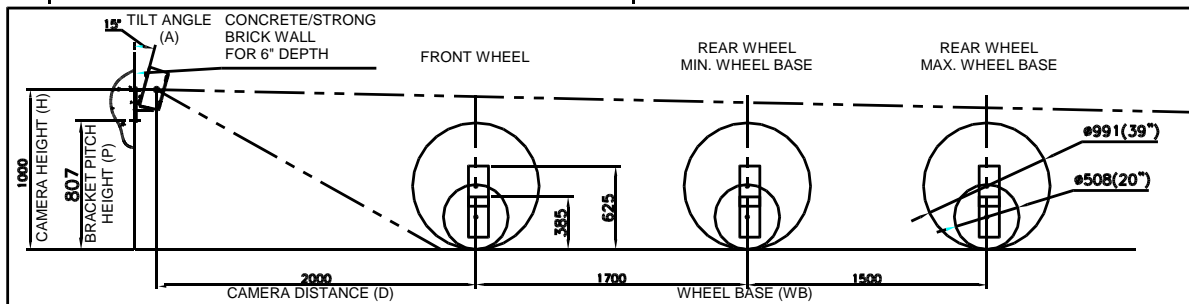
Fig. 3

PIT DIMENSIONS – Max. Wheel base – 3.2 & 4metre (For Wall mount model)

OVERALL PIT DIMENSIONS (17.8' x 12')
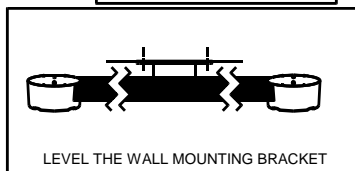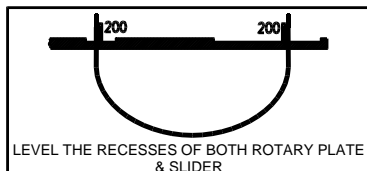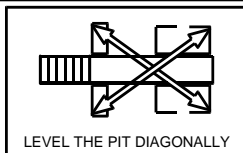LENGTH : 5428 (17.8')
WIDTH : 3660 (12')

SECTION – AA

DETAIL – B

15mm (5/8")

ROTARY PLATE
DEPTH: 50mm

ROTARY PLATE
DEPTH: 50mm

STEPS TO GO DOWN TO PIT

ROTARY PLATE CENTRE

LONGER SLIDER
DEPTH: 50mm #

LONGER SLIDER
DEPTH: 50mm #

BRACKET PITCH DETAIL

STEPS TO GO DOWN TO THE PIT

9" (TYP)
10" (TYP)
GROUND LEVEL
PIT

SPACE INDICATED FOR SLIDER
IN HIDDEN LINE IS OPTIONAL

SlNo	Description
1.	RAIL FOR TROLLEY – 50x12mm (2'x½') - MAT'L: M.S FLAT THE RAIL SHOULD BE PARTLY EMBEDDED IN THE GROUND THE HEIGHT OF THE RAIL FROM THE FLOOR LEVEL SHOULD BE 15mm (5/8")
2.	STEPS TO GO DOWN TO THE PIT
3.	PIT DEPTH – 1524mm (5')

TILT ANGLE (A)
CONCRETE/STRONG BRICK WALL FOR 6" DEPTH
FRONT WHEEL
REAR WHEEL MIN. WHEEL BASE
REAR WHEEL MAX. WHEEL BASE
CAMERA HEIGHT (H)
BRACKET PITCH HEIGHT (P)
Ø991(39")
Ø508(20")
CAMERA DISTANCE (D)
WHEEL BASE (WB)

WHEEL BASE TABLE:

MAX. WHEEL BASE	SLIDER SIZE	OVERALL PIT DIMN. LENGTH	OVERALL PIT DIMN WIDTH
3200	1500x750	5428 (17.8')	3360 (12')
4000	2400x750	6328 (20.8')	3360 (12')

LEVEL THE PIT DIAGONALLY

LEVEL THE RECESSES OF BOTH ROTARY PLATE & SLIDER

LEVEL THE WALL MOUNTING BRACKET

CAMERA VARIABLE HEIGHT FIXING & DISTANCE

TITLE ANGLE (A)	CAMERA HEIGHT (H)	BRACKET PITCH HEIGHT (P)	CAMERA TO ROTARY PLATE DISTNACE (D)	WHEEL BASE (WB)
15	1000	807	2000	4000
	1100	907		
	1200	1007	2100	3900
19	1300	1107	2000	4000
	1400	1207	2200	3800
	1500	1307	2300	3700
22	1600	1407	2200	3800
	1700	1507	2300	3700
	1800	1607	2500	3500

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. 4m WHEEL BASE PIT DIMN REF. WHEEL BASE TABLE
4. AFTER PLACING THE LONGER SLIDER (1500mm LENGTH) IN THE # INDICATED 2400mm LENGTH RECESS, REMAINING 900mm LENGTH HAS TO BE FILLED BY METAL SPACER (875x600x50)
5. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE

Fig. 4

2.2.2. ALIGNMENT LIFT DIMENSIONS (Applicable only for VH / Wall mount / Auto Boom / In-Lift models)

☞	Ensure that the rack/lift is safe and the lock mechanisms are secured. Check runways are co-planar at all heights & it is relatively leveled for ease of push-Pull Runout. Check the Turn tables are free from binding and rotates freely
☞	The Platform level should be same diagonally between the Left and Right rotary plates
☞	The Lift platform level and Vertical column base level should be same while the lift is in closed condition

SCISSOR LIFT DIMENSIONS – Max. Wheel base – 4 metre (For VH model)

OVERALL SCISSOR LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

NOTE:
1. U.O.S. ALL DIMENSIONS ARE IN mm.
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
3. * –DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE.
4. ** –HORIZONTAL BEAM CAN BE POSITIONED 1000 TO 2500mm.

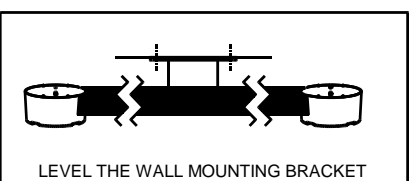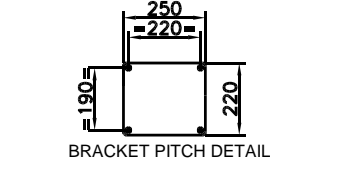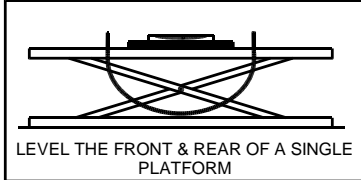CAMERA VARIABLE HEIGHT FIXING AND DISTANCE

TILT ANGLE	CAMERA HEIGHT	CAMERA TO ROTARY PLATE	WHEEL BASE
	2200	2000	4200
15	2350	2100	4100
	2500	2300	3900

Fig. 5

SCISSOR LIFT DIMENSIONS – Max. Wheel base – 4 metre (For Wall mount model)

OVERALL SCISSOR LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

MINIMUM ROOF HEIGHT – 14'

2200
1000
CAMERA HEIGHT (H)
1200
807
BRACKET PITCH HEIGHT (P)
CONCRETE/STRONG BRICK WALL FOR 6" DEPTH

220
128

SPACE FOR CABINET

WORKING AREA
* 2000

600   800   600

1700 (MIN. WHEEL BASE)

LIFT CENTRE LINE

4000 (MAX. WHEEL BASE)

REAR WHEEL SLIDER

REAR WHEEL SLIDER

TO BE VARIED DUE TO LIFT & RAMP DIMN.

3660 (12')

2000 CAMERA DISTANCE (D)

FRONT WHEEL

385
625

4000 (MAX. WHEEL BASE) WHEEL BASE (WB)

1700 REAR WHEEL MIN. WHEEL BASE

2300 REAR WHEEL MAX. WHEEL BASE

Ø990.5 (39")
Ø508 (20")

LEVEL THE TWO PLATFORMS
90° 90° 90° 90°

LEVEL THE PLATFORMS DIAGONALLY

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

BRACKET PITCH DETAIL
250
220
190
220

LEVEL THE WALL MOUNTING BRACKET

CAMERA VARIABLE HEIGHT FIXING & DISTANCE

TILT ANGLE (A)	CAMERA HEIGHT (H)	BRACKET PITCH HEIGHT(P)	CAMERA TO ROTARY PLATE DISTNCE (D)	WHEEL BASE (WB)
15	1000	807	2000	4000
	1100	907		
	1200	1007	2100	3900
19	1300	1107	2000	4000
	1400	1207	2200	3800
	1500	1307	2300	3700
22	1600	1407	2200	3800
	1700	1507	2300	3700
	1800	1607	2500	3500

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE

Fig. 6

SCISSOR LIFT DIMENSIONS – Max. Wheel base – 4 metre (For AutoBoom model)

OVERALL SCISSOR LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

MINIMUM ROOF HEIGHT – 14'

(CH) ***
(LH) ***
1000

377
50
150
20
610
= 820 =
610
20

WORKING AREA
* 2000

570

LIFT CENTRE LINE

REAR WHEEL SLIDER

REAR WHEEL SLIDER

LIFT   PIT

3660 (12')

TO BE VARIED DUE TO LIFT & RAMP DIMN.

4800

330

4000 (MAX. WHEEL BASE)

2000

1700

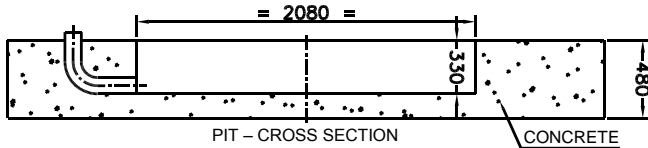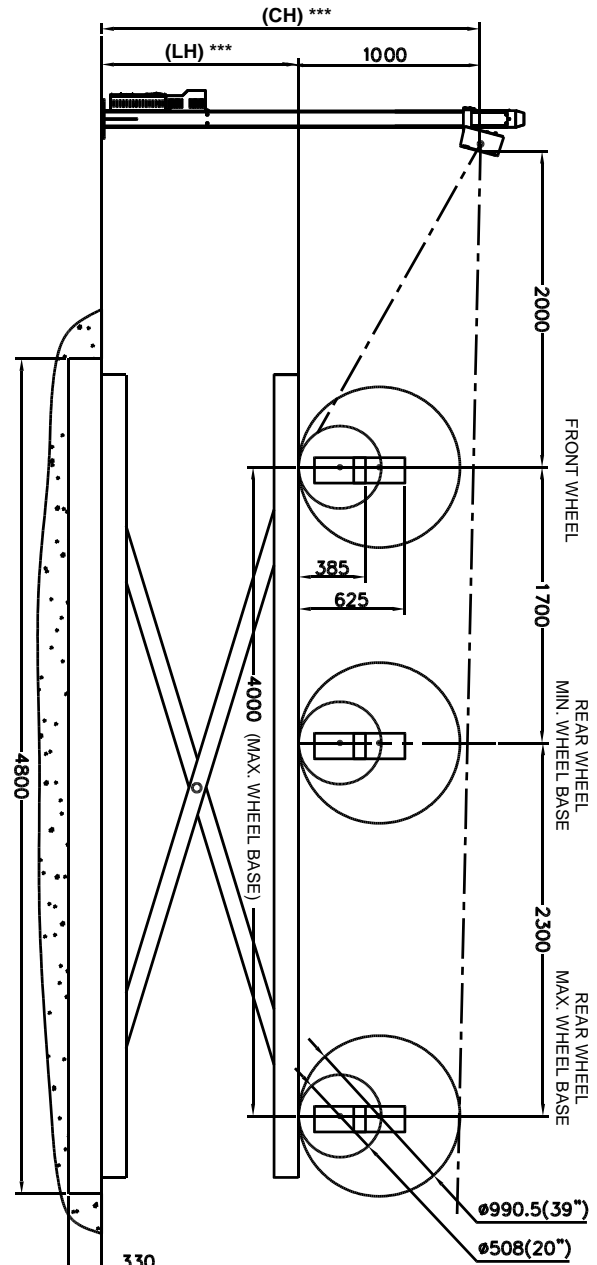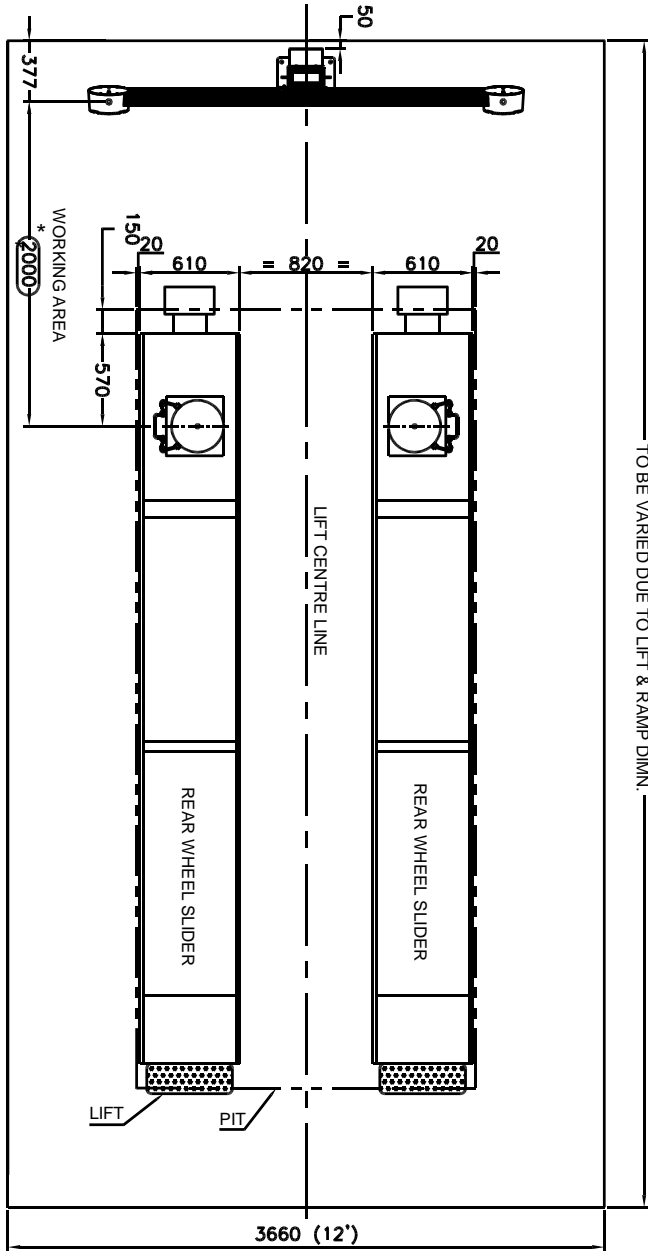2300

FRONT WHEEL

REAR WHEEL MIN. WHEEL BASE

REAR WHEEL MAX. WHEEL BASE

385
625

Ø990.5(39")
Ø508(20")

= 2080 =
330
480

PIT – CROSS SECTION

CONCRETE

Camera Height (CH) ***	Lift Height (LH) ***
2400	1400
2300	1300
2200	1200
2100	1100
2000	1000
1900	900
1800	800
1700	700
1600	600
1500	500
1400	400
1300	300
1200	200
1100	100
1000	0

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. PIT DIMENSIONS ARE SUITABLE FOR MANATEC LIFT ONLY. FOR OTHER LIFTS, DETAILS ARE TO BE OBTAINED FROM LIFT MANUFACTURER
4. CONCRETE MIXTURE – 1:2:4 (CEMENT:SAND:COARSE AGGREGATE (BLUE METAL-STONE)) CONCRETE THICKNESS – 150mm (MIN.)
5. LIFT TRAVEL TIME TO BE ADJUSTED AS 60sec. ±5sec. IN HYDRAULIC SYSTEM FOR LIFTING/LOWERING THE PLATFORM TO 1200mm
6. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE
7. A DISTANCE OF 1000mm SHOULD BE MAINTAINED BETWEEN CAMERA CENTRE & LIFT PLATFORM
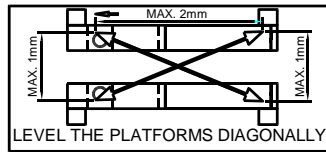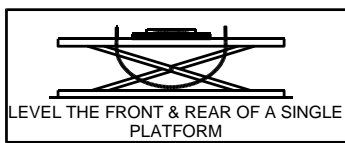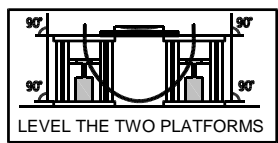8. HORIZONTAL BEAM CAN BE POSITIONED BETWEEN 900 – 2400mm

90° 90° 90° 90°
LEVEL THE TWO PLATFORMS

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

MAX. 2mm
MAX. 1mm   MAX. 1mm
LEVEL THE PLATFORMS DIAGONALLY

Fig. 7

SCISSOR LIFT DIMENSIONS – Max. Wheel base – 4.6 metre (For In-Lift model)

FOR RIGHT HAND DRIVE VEHICLE

OVERALL SCISSOR LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3375 (11')

MINIMUM ROOF HEIGHT – 14'

3375
2700
2360
867
430 430
620 860 620

CAMERA CENTER TO TARGET CENTER
1125

DISPLAY VALUE:
FL XD = 175
RL XD = 175

REF. NOTE -5
LIFT CENTRE LINE

DISPLAY VALUE:
FR XD = 175
RR XD = 175

POWER PACK

REAR WHEEL SLIDER

REAR WHEEL SLIDER

6488
5550
4500
1050

SCISSOR LIFT

1125
1845

FLOOR

WATER LEVEL TUBE
90° 90°
90° 90°
LEVEL THE TWO PLATFORMS

WATER LEVEL TUBE
LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

LEVEL THE PLATFORMS DIAGONALLY

WATER LEVEL TUBE
LEVEL THE TWO COLUMN FIXING FRAME

NOTE:
1. FIX THE EXTENSION SPACER, WING, VERTICAL COLUMN ON SCISSOR LIFT IN BOTH SIDE.
2. KEEP FOUR SHAFT CALIBRATION KIT ON SCISSOR LIFT AT THE DISTANCE OF 1125mm FROM CAMERA BY VIEWING THE MONITOR DISPLAYED VALUE.
3. XD SETTING EQUAL FOR FL&RL FR&RR.
4. SET BOTH LEFT & RIGHT ANGLE AS PER THE FACTORY SETTING TOL.±0.2°.
5. MAINTAIN THE SCISSOR LIFT DIMENSION THROUGHOUT.
6. LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
7. U.O.S. ALL DIMENSIONS ARE IN mm.

Fig. 8

SCISSOR LIFT DIMENSIONS – Max. Wheel base – 4.6 metre (For In-Lift model)

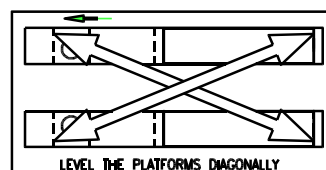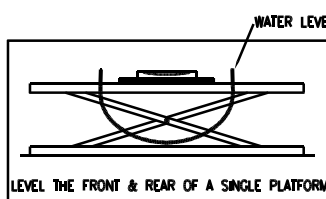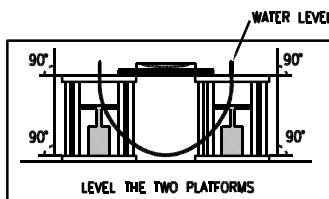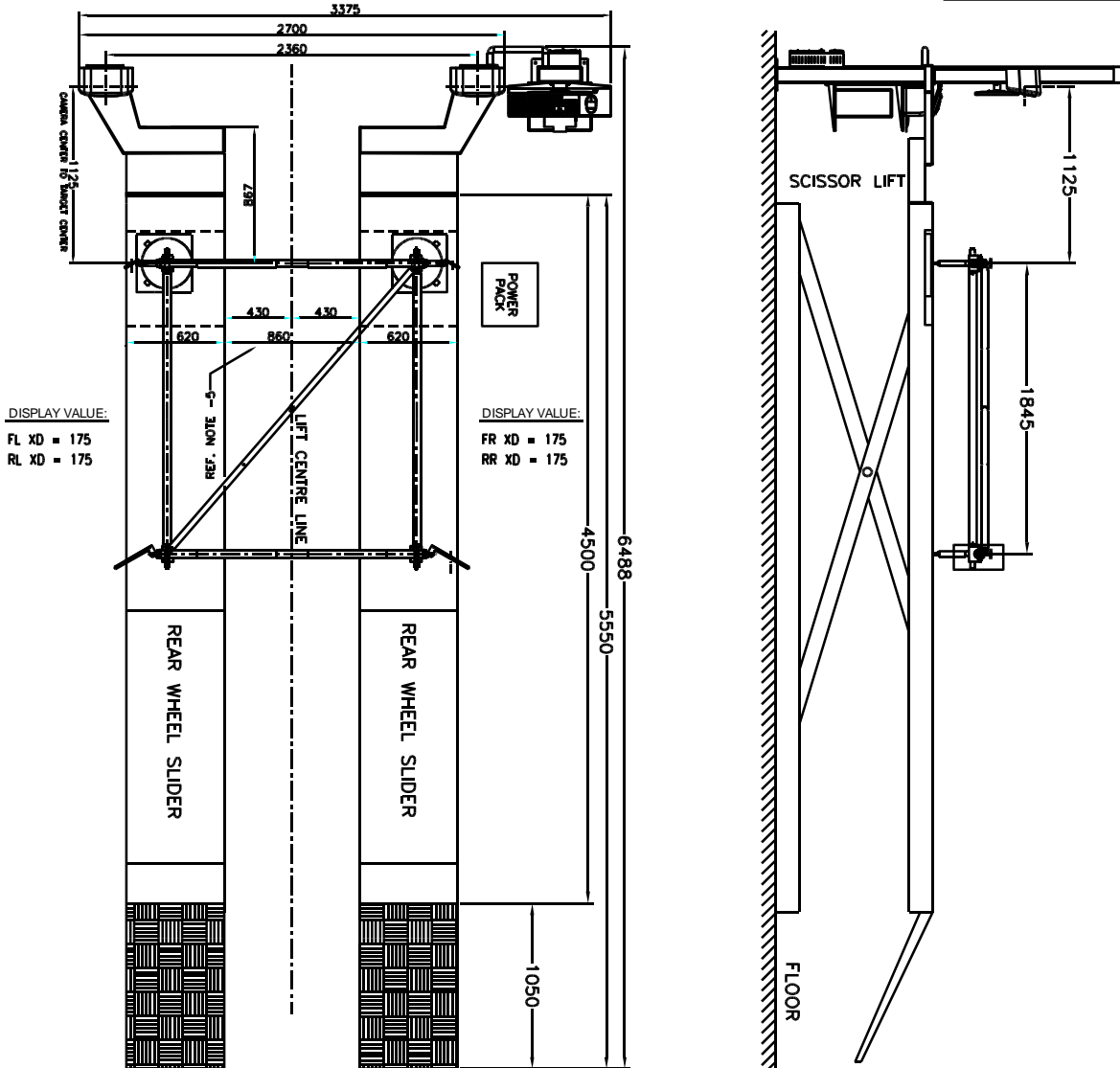## FOR LEFT HAND DRIVE VEHICLE

OVERALL SCISSOR LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3375 (11')

MINIMUM ROOF HEIGHT – 14'

3376
2700
2360

867

POWER PACK

430   430
620   860   620

CAMERA CENTER TO TARGET CENTER — 1125

DISPLAY VALUE:

FL XD = 175
RL XD = 175

DISPLAY VALUE:

FR XD = 175
RR XD = 175

REF. NOTE –5

LIFT CENTRE LINE

6488

4500

5550

1050

1125

1845

REAR WHEEL SLIDER

REAR WHEEL SLIDER

SCISSOR LIFT

FLOOR

WATER LEVEL TUBE

90°   90°
90°   90°

LEVEL THE TWO PLATFORMS

WATER LEVEL TUBE

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

LEVEL THE PLATFORMS DIAGONALLY

WATER LEVEL TUBE

LEVEL THE TWO COLUMN FIXING FRAME

NOTE:
1. FIX THE EXTENSION SPACER, WING, VERTICAL COLUMN ON SCISSOR LIFT IN BOTH SIDE.
2. KEEP FOUR SHAFT CALIBRATION KIT ON SCISSOR LIFT AT THE DISTANCE OF 1125mm FROM CAMERA BY VIEWING THE MONITOR DISPLAYED VALUE.
3. XD SETTING EQUAL FOR FL&RL FR&RR.
4. SET BOTH LEFT & RIGHT ANGLE AS PER THE FACTORY SETTING TOL.±0.2°.
5. MAINTAIN THE SCISSOR LIFT DIMENSION THROUGHOUT.
6. LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
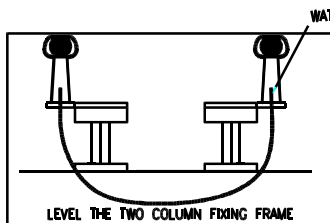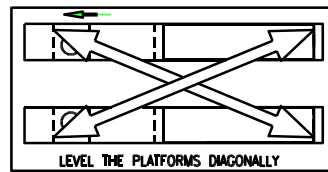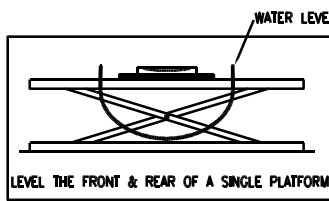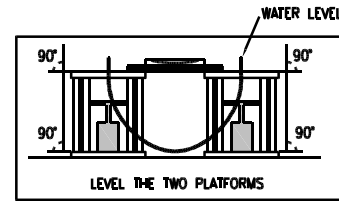7. U.O.S. ALL DIMENSIONS ARE IN mm.

Fig. 9

FOUR POST LIFT DIMENSIONS – Max. Wheel base – 4 metre (For VH model)

OVERALL FOUR POST LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

MINIMUM ROOF HEIGHT – 14'

524

(2000)

50

2872

1390

500   490   = 800 =   490   592

1830 (MIN.WHEEL BASE)

FIXED RUNWAY

LIFT CENTRE LINE

ADJUSTABLE RUNWAY

4000 (MAX.WHEEL BASE)

REAR WHEEL SLIDER

REAR WHEEL SLIDER

TO BE VARIED DUE TO LIFT & RAMP DIMENSIONS

5377

3660 (12')

2200*

1200

2000

FRONT WHEEL

385

625

1830

REAR WHEEL MIN.WHEEL BASE

4000 (MAX.WHEEL BASE)

2170

REAR WHEEL MAX.WHEEL BASE

⌀990.5(39")

⌀508(20")

WATER LEVEL TUBE

WATER LEVEL TUBE

90°   90°

LEVEL THE TWO PLATFORMS

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

LEVEL THE PLATFORMS DIAGONALLY

NOTE:
1. U.O.S. ALL DIMENSIONS ARE IN mm.
2. LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm.
3. *–HORIZONTAL BEAM CAN BE POSITIONED 1000 TO 2500mm.

CAMERA VARIABLE HEIGHT FIXING AND DISTANCE

TILT ANGLE	CAMERA HEIGHT	CAMERA TO ROTARY PLATE	WHEEL BASE
15	2200	2000	4200
	2350	2100	4100
	2500	2300	3900

Fig. 10

FOUR POST LIFT DIMENSIONS – Max. Wheel base – 4 metre (For Wall mount model)

OVERALL FOUR POST LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

MINIMUM ROOF HEIGHT – 14'

2200
1000
1200
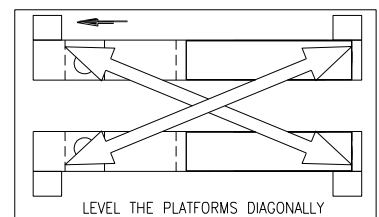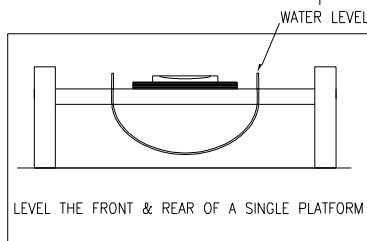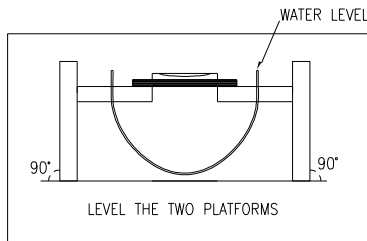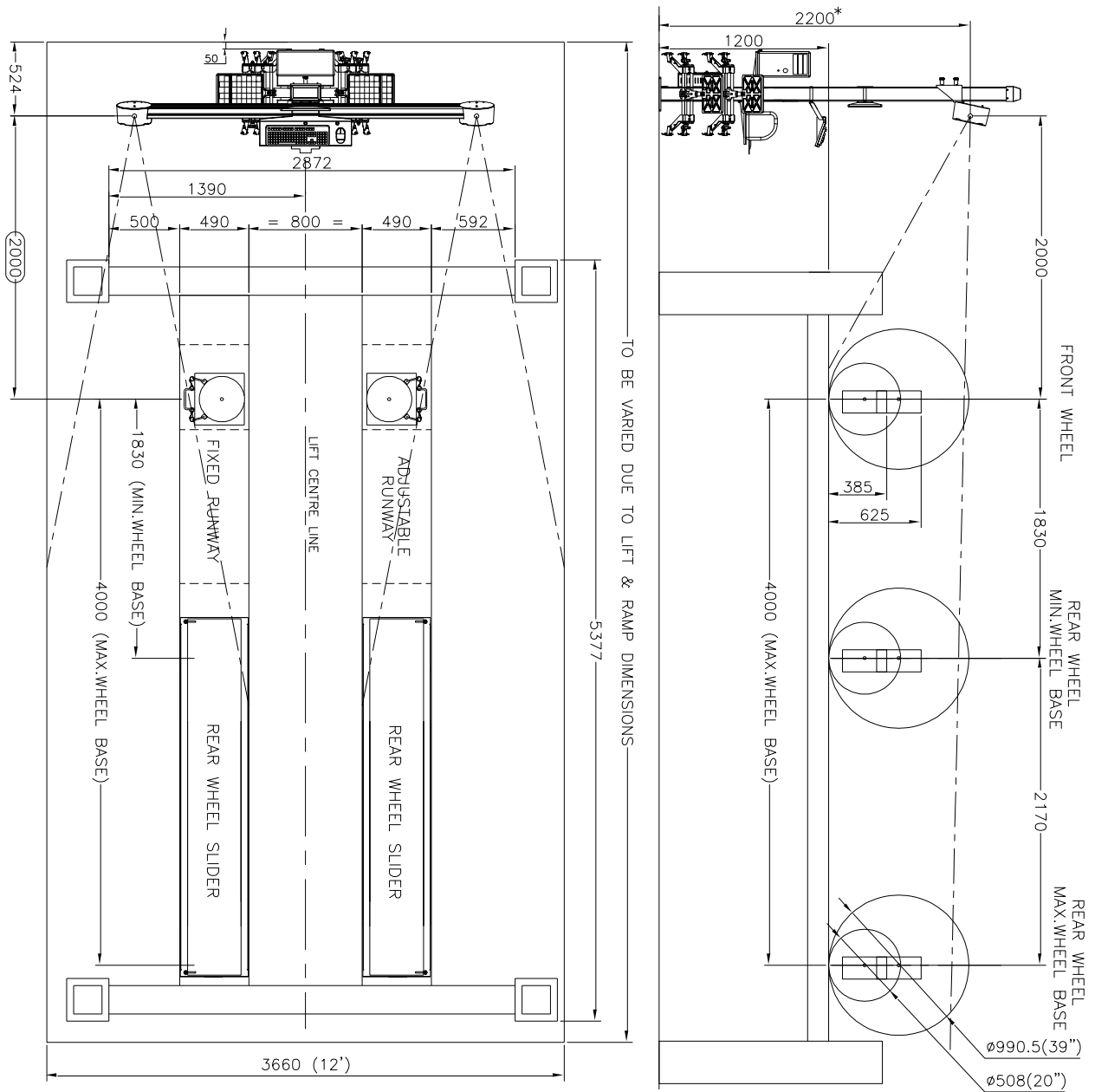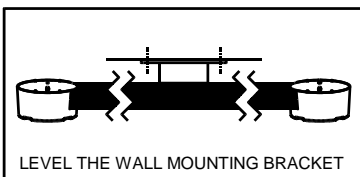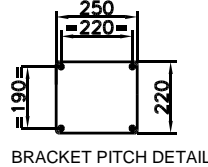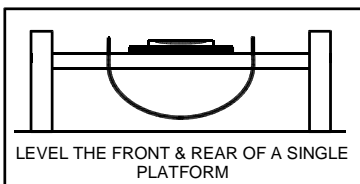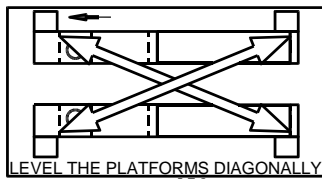CAMERA HEIGHT (H)
807
BRACKET PITCH HEIGHT (P)

128
220

SPACE FOR CABINET

2872
1390
500   490   800   490   592

WORKING AREA * (2000)

CONCRETE/STRONG BRICK WALL FOR 6" DEPTH

CAMERA DISTANCE (D)
2000

FRONT WHEEL

1700 (MIN. WHEEL BASE)

FIXED RUNWAY

LIFT CENTRE LINE

ADJUSTABLE RUNWAY

REAR WHEEL SLIDER

REAR WHEEL SLIDER

4000 (MAX. WHEEL BASE)

TO BE VARIED DUE TO LIFT & RAMP DIMN.

5377

385
625

4000 (MAX. WHEEL BASE) WHEEL BASE (WB)

1700 REAR WHEEL MIN. WHEEL BASE

2300 REAR WHEEL MAX. WHEEL BASE

Ø990.5(39")
Ø508(20")

3660 (12')

90°   90°
LEVEL THE TWO PLATFORMS

LEVEL THE PLATFORMS DIAGONALLY

250
220
190
220
BRACKET PITCH DETAIL

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

LEVEL THE WALL MOUNTING BRACKET

CAMERA VARIABLE HEIGHT FIXING & DISTANCE

TILT ANGLE (A)	CAMERA HEIGHT (H)	BRACKET PITCH HEIGHT(P)	CAMERA TO ROTARY PLATE DISTNCE (D)	WHEEL BASE (WB)
15	1000	807	2000	4000
	1100	907		
	1200	1007	2100	3900
19	1300	1107	2000	4000
	1400	1207	2200	3800
	1500	1307	2300	3700
22	1600	1407	2200	3800
	1700	1507	2300	3700
	1800	1607	2500	3500

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE

Fig. 11

FOUR POST LIFT DIMENSIONS-Max. Wheel base–4metre (For AutoBoom)

OVERALL FOUR POST LIFT DIMENSIONS
LENGTH : WILL BE VARIED BASED ON LIFT DIMENSIONS
WIDTH : 3660 (12')

MINIMUM ROOF HEIGHT – 14'

Plan view labels:
- 50
- 377
- WORKING AREA * 2000
- 2872
- 1390
- 500 490 800 490 592
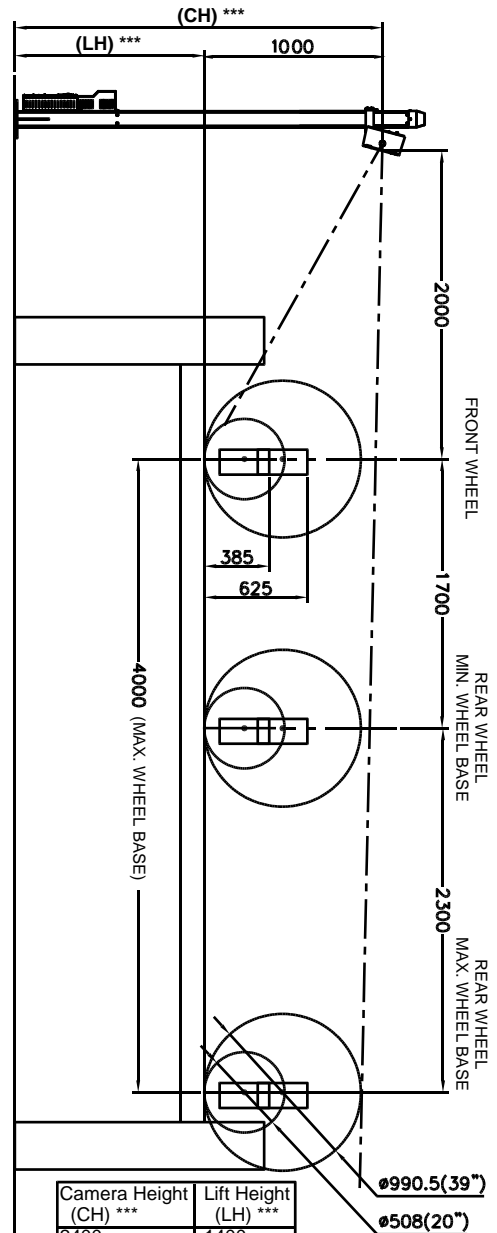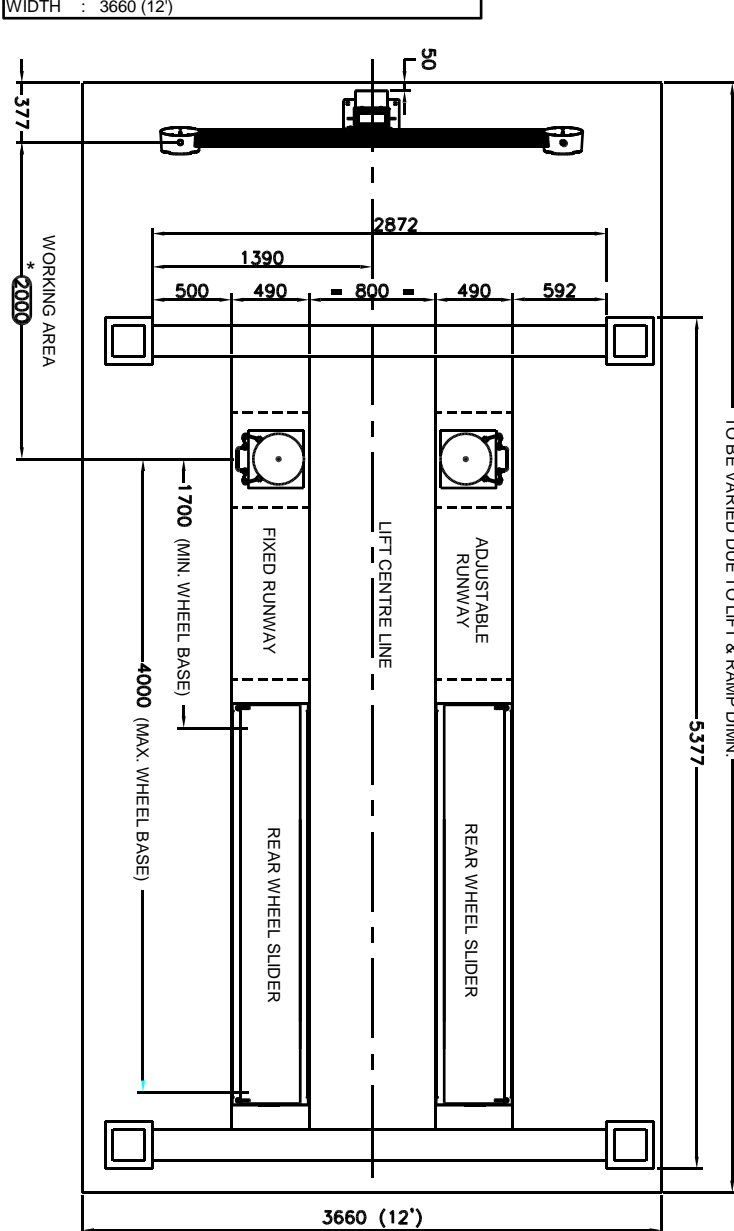- 1700 (MIN. WHEEL BASE)
- 4000 (MAX. WHEEL BASE)
- FIXED RUNWAY
- LIFT CENTRE LINE
- ADJUSTABLE RUNWAY
- REAR WHEEL SLIDER
- REAR WHEEL SLIDER
- 5377
- TO BE VARIED DUE TO LIFT & RAMP DIMN.
- 3660 (12')

Right view labels:
- (CH) ***
- (LH) ***
- 1000
- 2000
- 4000 (MAX. WHEEL BASE)
- 385
- 625
- FRONT WHEEL
- REAR WHEEL MIN. WHEEL BASE
- 1700
- 2300
- REAR WHEEL MAX. WHEEL BASE
- ø990.5(39")
- ø508(20")

Camera Height (CH) ***	Lift Height (LH) ***
2400	1400
2300	1300
2200	1200
2100	1100
2000	1000
1900	900
1800	800
1700	700
1600	600
1500	500
1400	400
1300	300
1200	200
1100	100
1000	0

NOTE:
1. U.O.S – ALL DIMENSIONS ARE IN mm
2. FLOOR/PLATFORM LEVEL TOLERANCE ALLOWED SHOULD BE LESS THAN 2mm
3. LIFT TRAVEL TIME TO BE ADJUSTED AS 60sec. ±5sec. IN HYDRAULIC SYSTEM FOR LIFTING/LOWERING THE PLATFORM TO 1200mm
4. * - DISTANCE BETWEEN CAMERA & TURN TABLE CAN BE ALTERED FROM 2000 – 2400mm BASED ON THE AVAILABILITY OF SPACE
5. A DISTANCE OF 1000mm SHOULD BE MAINTAINED BETWEEN CAMERA CENTRE & LIFT PLATFORM
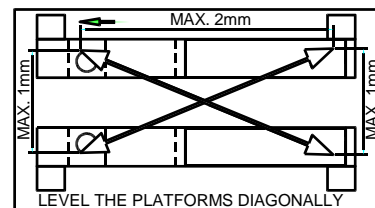6. HORIZONTAL BEAM CAN BE POSITIONED BETWEEN 900 – 2400mm

LEVEL THE TWO PLATFORMS

90°   90°

LEVEL THE FRONT & REAR OF A SINGLE PLATFORM

MAX. 2mm
MAX. 1mm
MAX. 1mm
LEVEL THE PLATFORMS DIAGONALLY
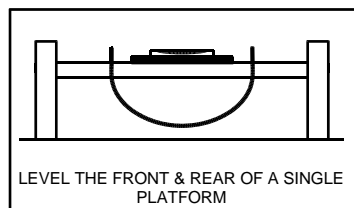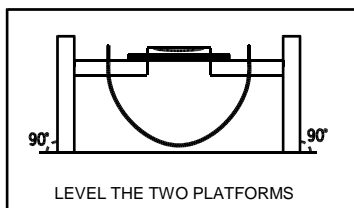
Fig. 12

FOUR POST LIFT DIMENSIONS-Max. Wheel base–4metre (For In-Lift)

2360

1323

691

(213)

1345

1800

1125

1183
(VERTICAL COLUMN
FACE TO ROTARY
PLATE CENTER)

(861)

1000
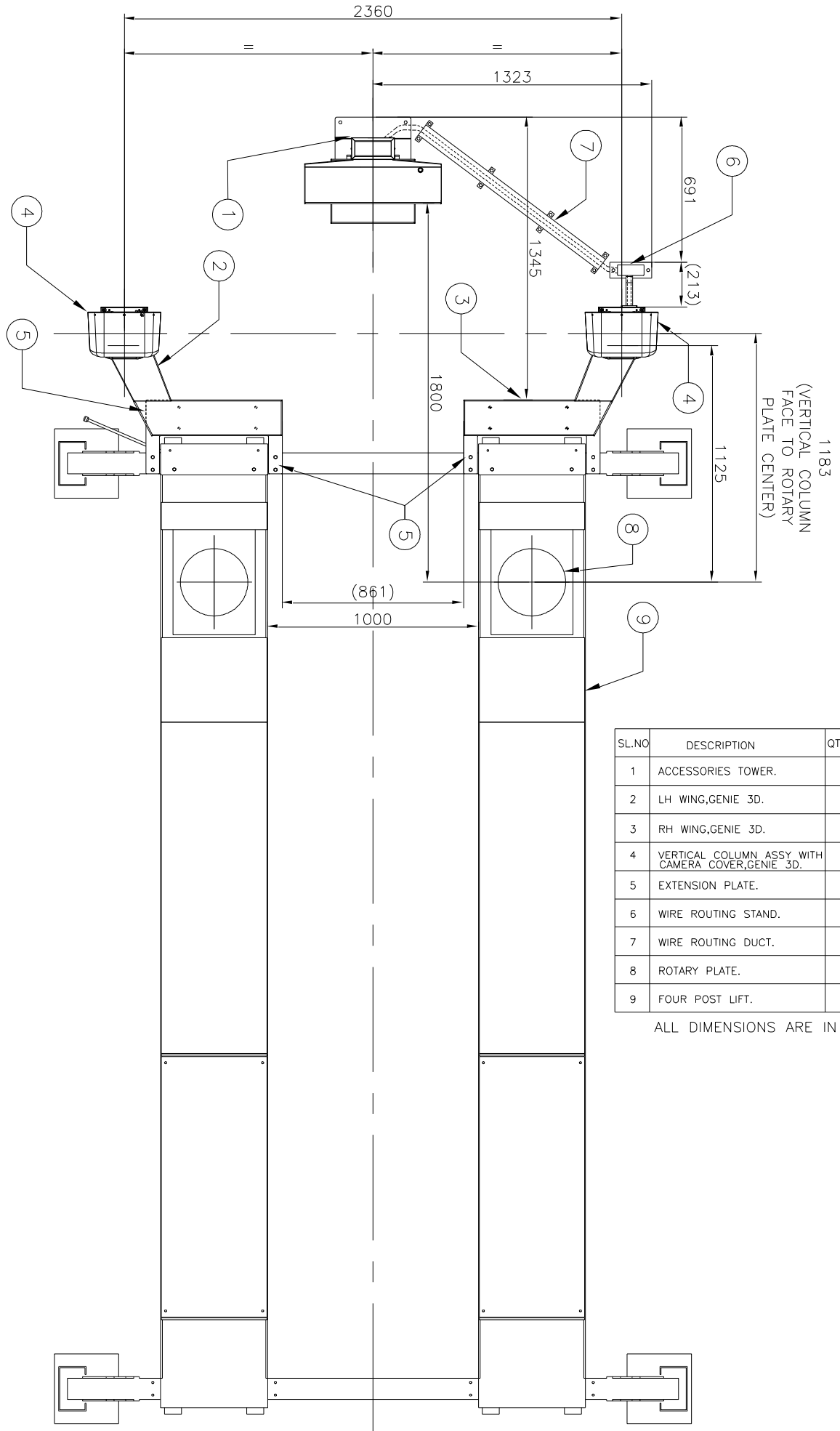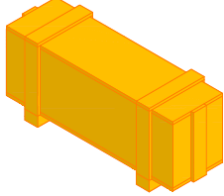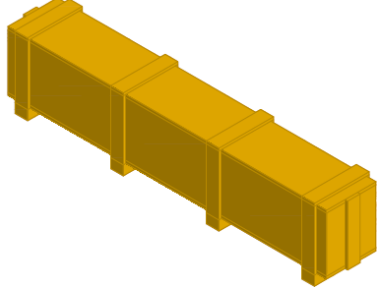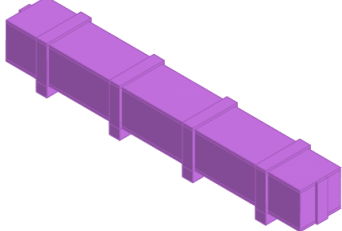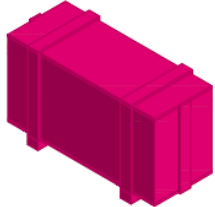
SL.NO	DESCRIPTION	QTY(Nos)
1	ACCESSORIES TOWER.	1
2	LH WING,GENIE 3D.	1
3	RH WING,GENIE 3D.	1
4	VERTICAL COLUMN ASSY WITH CAMERA COVER,GENIE 3D.	2
5	EXTENSION PLATE.	2
6	WIRE ROUTING STAND.	1
7	WIRE ROUTING DUCT.	1
8	ROTARY PLATE.	2
9	FOUR POST LIFT.	1

ALL DIMENSIONS ARE IN 'MM'

Fig. 13

3. PACKING IDENTIFICATION
For PT / VH / AVH models

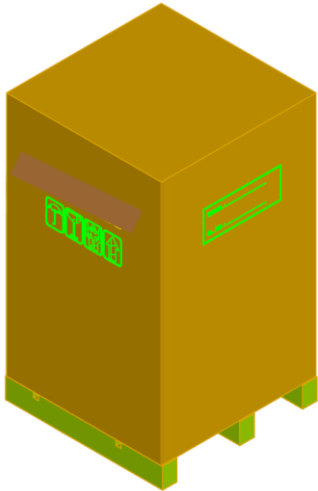| Package No.	Package description	Package contents	
		Part name	Qty
1/4	Vertical column wooden box Pit model: VH / AVH model: 	Vertical column with Interface box	1 No.
		Monitor column (***)	1 No.
		CPU Tray (***)	1 No.
		Keyboard tray (***)	1 No.
		Printer tray (***)	1 No.
		Steering lock (*)	1 No.
		Brake pedal lock (*)	1 No.
		Wheel stopper (*)	2 Nos.
		Multimedia speaker (*)	1 Pair
		3A, Dia 5mm x 20mm, Slow blow type Glass fuse	1 No.
		5A, Dia 6.35mm x 31.8mm, Slow blow type Glass fuse	1 No.
2/4	Horizontal beam corrugated box 	Horizontal beam with Camera in EPE foam	1 No.
		Target plate-Front Left in EPE foam	1 No.
		Target plate-Front Right in EPE foam	1 No.
		Target plate-Rear Left in EPE foam	1 No.
		Target plate-Rear Right in EPE foam	1 No.
		Software CD	1 No.
		Calibration data CD	1 No.
3/4(*)	Accessories wooden box (*as applicable*) Contents: 1. Wheel bracket corrugated box (*) 2. Rotary plate wooden box (*) 3. PC Console box (*) 4. Monitor box (*)	Wheel bracket in Thermocole box (*)	4 Nos.
		Rotary plate (*)	2 Nos.
		Personal computer & cables (*)	1 Set
		Wall mounting bracket (*)	1 No.
		Monitor, 19.5" (*)	1 No.

Package No.	Package description	Package contents	
		Part name	Qty
4/4(*)	Main cabinet corrugated box (*as applicable*)	Main cabinet	1 No.
		Monitor column	1 No.
		Wheel bracket holder-Long	2 Nos.
		Wheel bracket holder-Short	2 Nos.
		Brake pedal lock (*)	1 No.
		Steering lock (*)	1 No.
		Wheel stopper (*)	2 Nos.
		Printer (*)	1 No.
		Multimedia speaker (*)	1 Pair
		MCB unit (**)	1 No.
		3A, Dia 5mm x 20mm, Slow blow type Glass fuse	1 No.
		5A, Dia 6.35mm x 31.8mm, Slow blow type Glass fuse	1 No.
	Optional accessories		
1	Four shaft calibration kit wooden box	Four shaft calibration kit	1 Set
2	Rear wheel slider wooden box	Rear wheel slider	2 Nos.
3	Printer box	Printer, A4 size	1 No.

NOTE: (*)   - Refer scope of supply

(**)   - Not applicable for AVH models

(***)   - Not applicable for VH / AVH with Cabinet models

Refer Despatch Intimation for the list of applicable accessories

For Drive Through models

Package No.	Package description	Package contents	
		Part name	Qty
1/6	Vertical column (LH) wooden box	Camera mounted Vertical column (LH) with Hub board box	1 No.
2/6	Vertical column (RH) wooden box	Camera mounted Vertical column (RH)	1 No.
3/6	Accessories wooden box	Accessories mounting column with Interface box	1 No.
		Vertical column cable	1 No.
		Monitor column	1 No.
		CPU Tray	1 No.
		Keyboard tray	1 No.
		Printer tray	1 No.
		Wheel bracket holder, Long	2 Nos.
		Wheel bracket holder, Short	2 Nos.
		Steering lock (*)	1 No.
		Brake pedal lock (*)	1 No.
		Wheel stopper (*)	2 Nos.
		Fuse, 3A, Ø5x20mm, Slow blow type	1 No.
		Windows8 Embdd OS CD (*)	1 No.
		"Align+" SW CD	1 No.
		Calibration data CD	1 No.
		USB Hub	1 No.
		Fuse, 5A, Ø6.35x31.8mm, Slow blow type	1 No.
4/6	Target plate corrugated box	Target plate-Front Left in EPE foam	1 No.
		Target plate-Front Right in EPE foam	1 No.
		Target plate-Rear Left in EPE foam	1 No.
		Target plate-Rear Right in EPE foam	1 No.
5/6	Wheel bracket corrugated box	Wheel bracket in Thermocole box (*)	4 Nos.
6/6	Rotary plate wooden box	Rotary plate (*)	2 Nos.

For In-Lift models

Package No.	Package description	Package contents	
		Part name	Qty
1/2	Vertical column wooden box	Camera mounted Vertical column (LH)	1 No.
		Camera mounted Vertical column (RH) with Hub board	1 No.
		Wheel bracket holding post, 2 holder	2 Nos.
		Mini Target plate-Front Left in EPE foam	1 No.
		Mini Target plate-Front Right in EPE foam	1 No.
		Target plate-Rear Left in EPE foam	1 No.
		Target plate-Rear Right in EPE foam	1 No.
		PC Console box ➢ Desktop computer (*)	1 No.
		Monitor	1 No.
		Printer (*)	1 No.
		Multimedia speaker (*)	1 Pair
		Windows Embedded OS CD (*)	1 No.
		"Align+" SW CD	1 No.
		Calibration data CD	1 No.
		Fuse, 3A, Ø5x20mm, Slow blow type	1 No.
		Fuse, 5A, Ø6.35x31.8mm, Slow blow type	1 No.
		Wheel bracket corrugated box ➢ Wheel bracket in Thermocole box (*)	4 Nos.
		Rotary plate wooden box ➢ Rotary plate (*)	2 Nos.
2/2	Accessories wooden box	Accessories mounting column with Interface box	1 No.
		Monitor Mounting stand	1 No.
		CPU Tray	1 No.
		Keyboard tray	1 No.
		Printer tray	1 No.
		Steering lock	1 No.
		Brake pedal lock	1 No.
		Wheel stopper	2 Nos.

4. INTEGRATION

Inspect each component for damage, notify shipping company immediately if damaged and report any shortages to customer service.

4.1. EQUIPMENT INTEGRATION

4.1.1. VERTICAL COLUMN

Assemble the CPU tray, Keyboard tray, Printer tray & Wheel bracket holders with Vertical column as shown below. Trays/Holders will not be provided if Main cabinet is supplied in VH/AVH model.

Fix the Monitor column with supporting plate on the Vertical column and then fix the Monitor to it (Fix the Monitor supporting plate with Monitor clamp in Vertical column in case of VH model).

The Interface box will be fixed with Vertical column at factory itself. Interface box will be fixed with Main cabinet, if Cabinet is supplied in VH model.
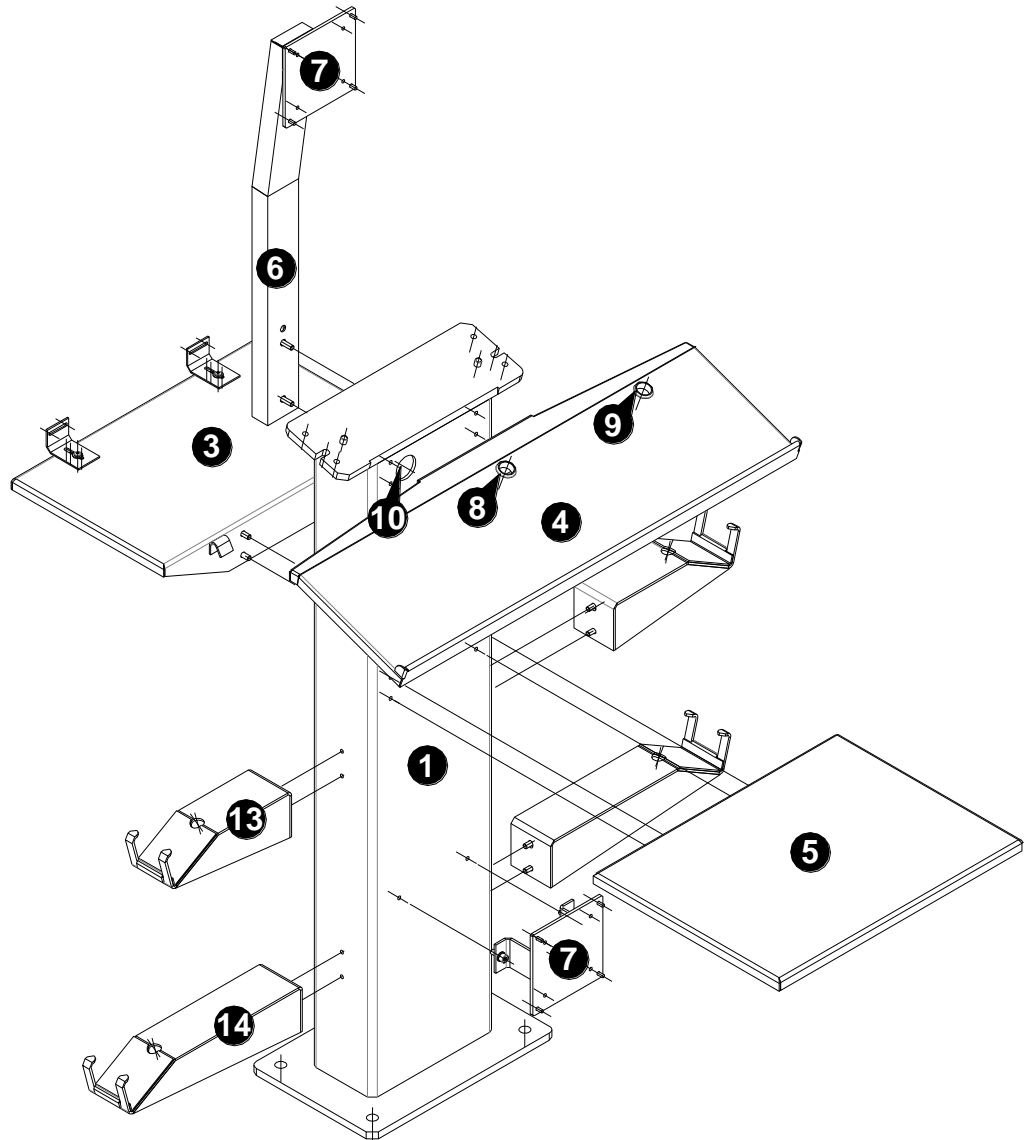
PT model

Fig. 14

Sl.No.	Description	Sl.No.	Description
1	Vertical column	8	Keyboard cable routing hole
2	Horizontal beam bracket	9	Mouse cable routing hole
3	Desktop computer tray	10	PC peripherals cable routing hole
4	Keyboard & Mouse tray	11	Keyboard/Monitor plate clamp
5	Printer tray	12	Vertical column top cover
6	Monitor column	13	Wheel bracket holder, Short
7	Monitor column support plate	14	Wheel bracket holder, Long

VH model

Fig. 15

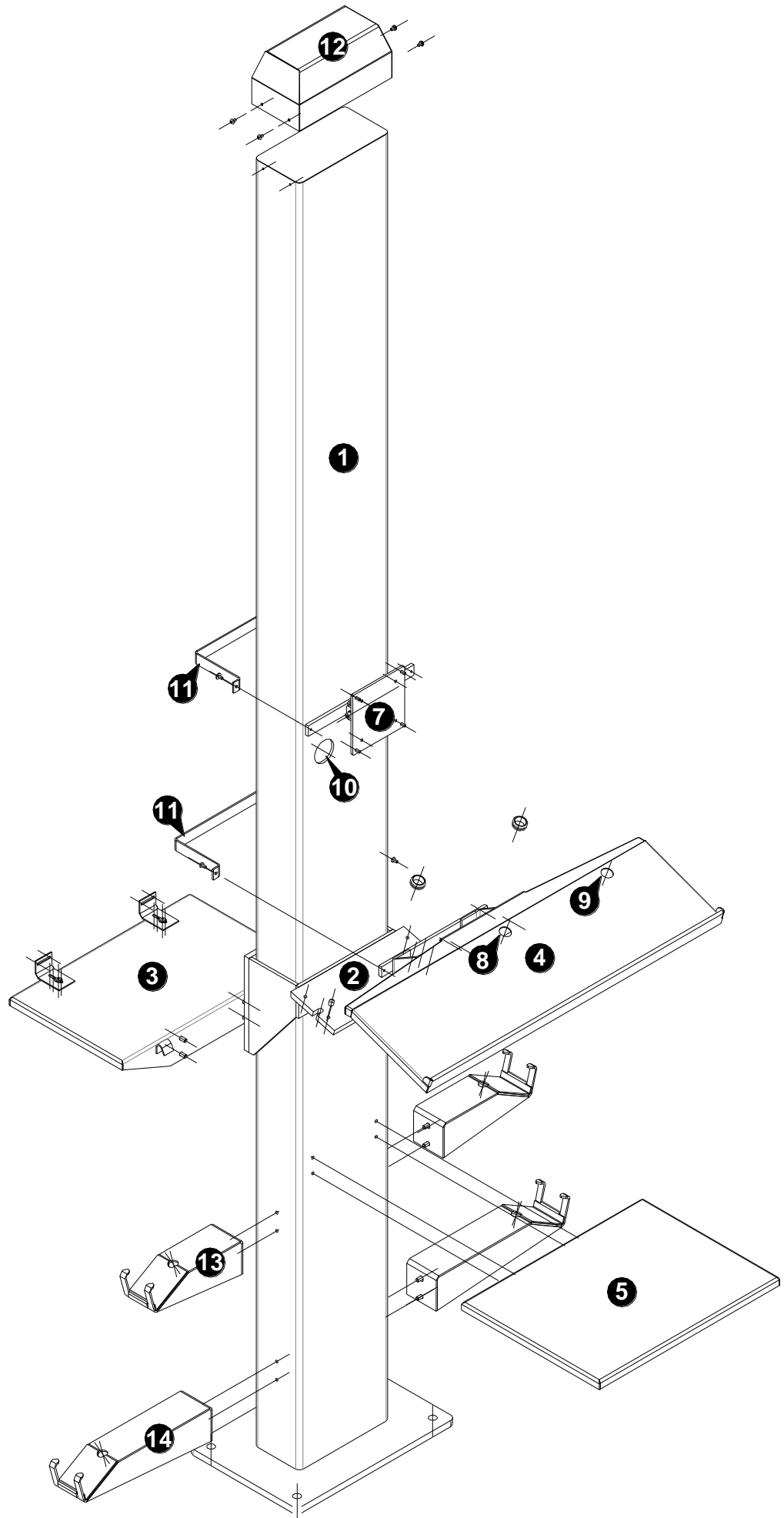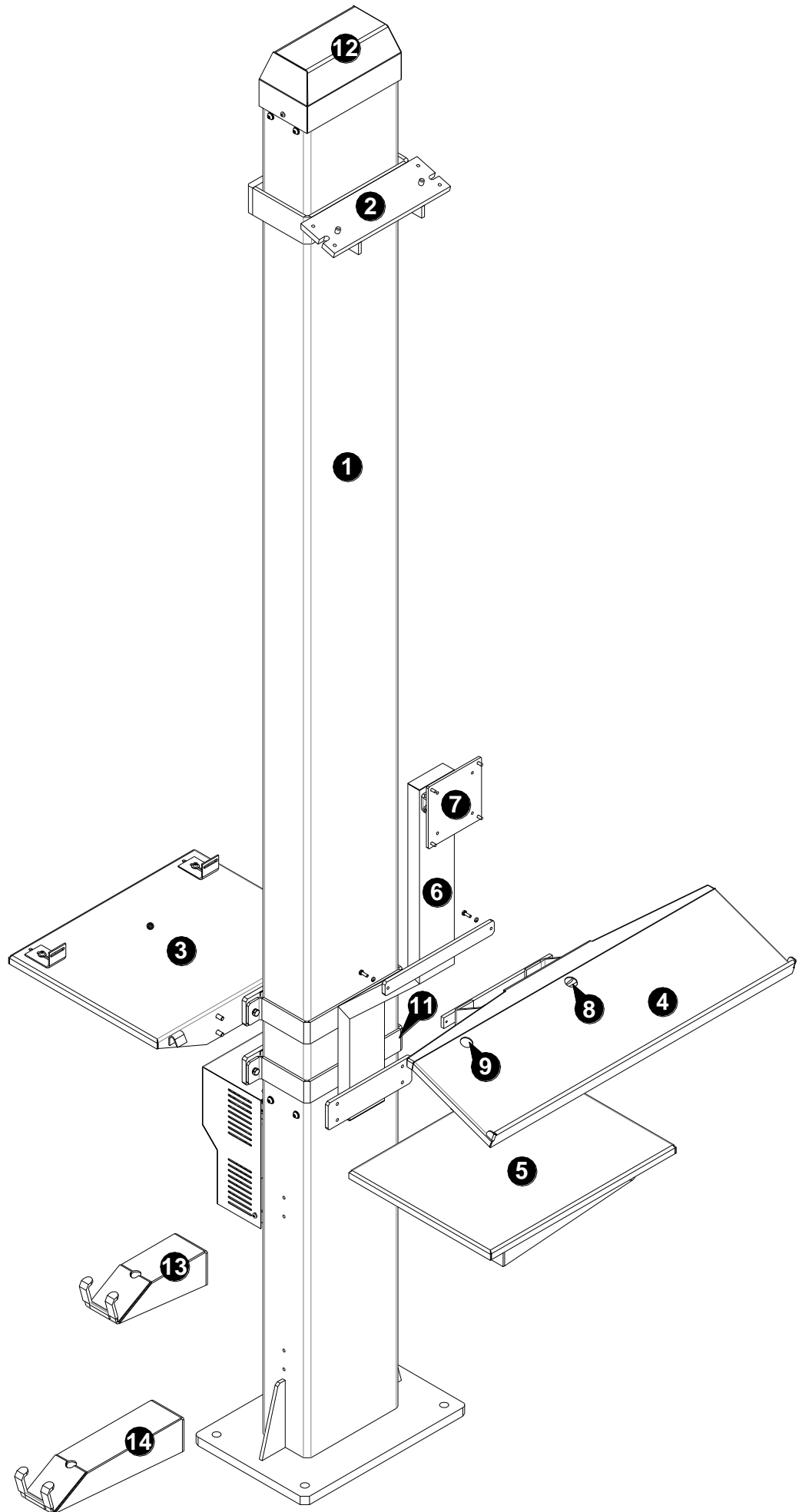**AVH model**

Fig. 16

In-Lift model

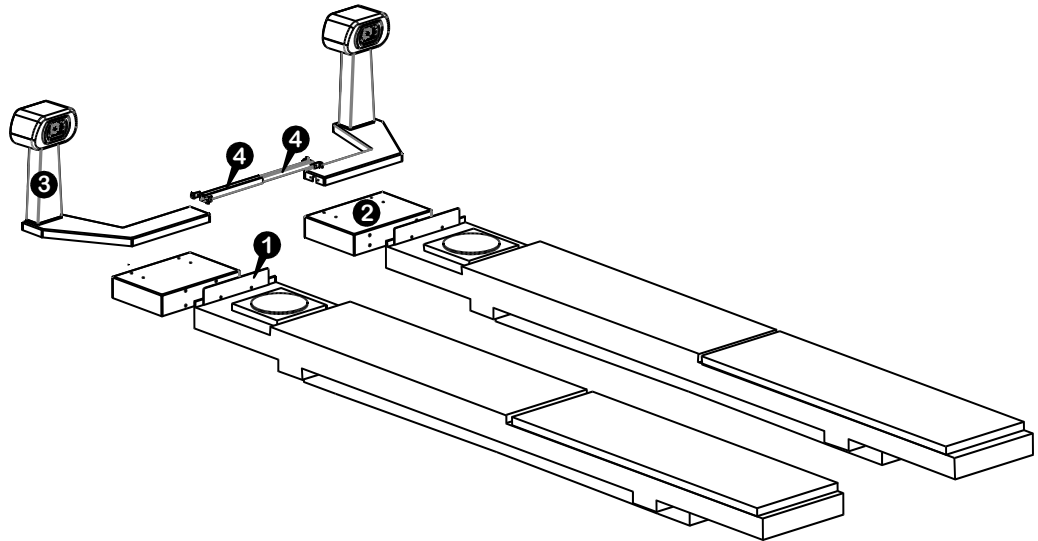Fix the Stopper plates (1) with the front face of both the Lift platforms.

Fig. 17

Fix the Extension spacers (2) with both the front face of Lift platform and then fix the respective Camera column frames (3) with the Spacer.

Fix the Cable routing tubes (4) with both the Column frames.

4.1.2. HORIZONTAL BEAM (NA for In-Lift model)

☞ **Horizontal beam is pre-assembled and is factory calibrated which can be placed into service shortly after installation and setup**

Place the Horizontal beam over the seating plate / Bracket in Vertical column / Wall mount bracket and fix it using fasteners supplied. Use Jack screws for adjustment, if required.

In case of VH model, fix the Beam mounting bracket with Vertical column at the desired height using the provisions given in Vertical column by pulling out the Lock knobs and moving the Bracket to desired location. Now lock the knobs followed by top Grub screws first & then the bottom screws.

Now fix Horizontal beam over the Bracket.

Camera, LED driver & Hub board and IR LED boards are internally connected in the Horizontal beam.

For AVH model, open the Hub board cover and connect the USB Type-B Male connector to LED Driver & Hub board. Connect 5Pin BSM connector from Interface box to the Horizontal beam at the rear side.
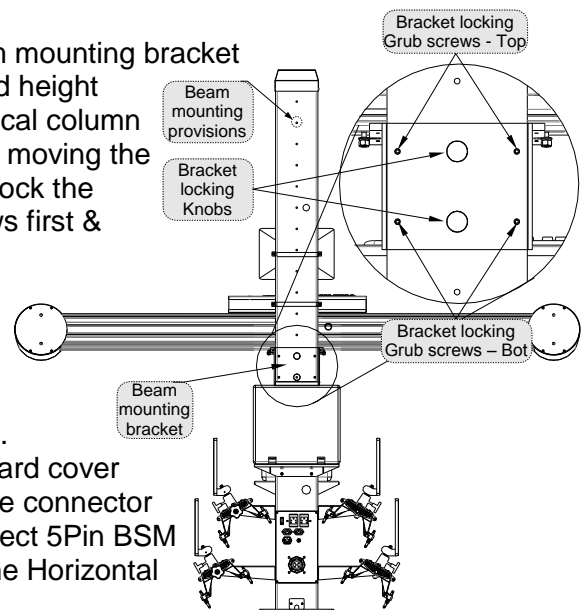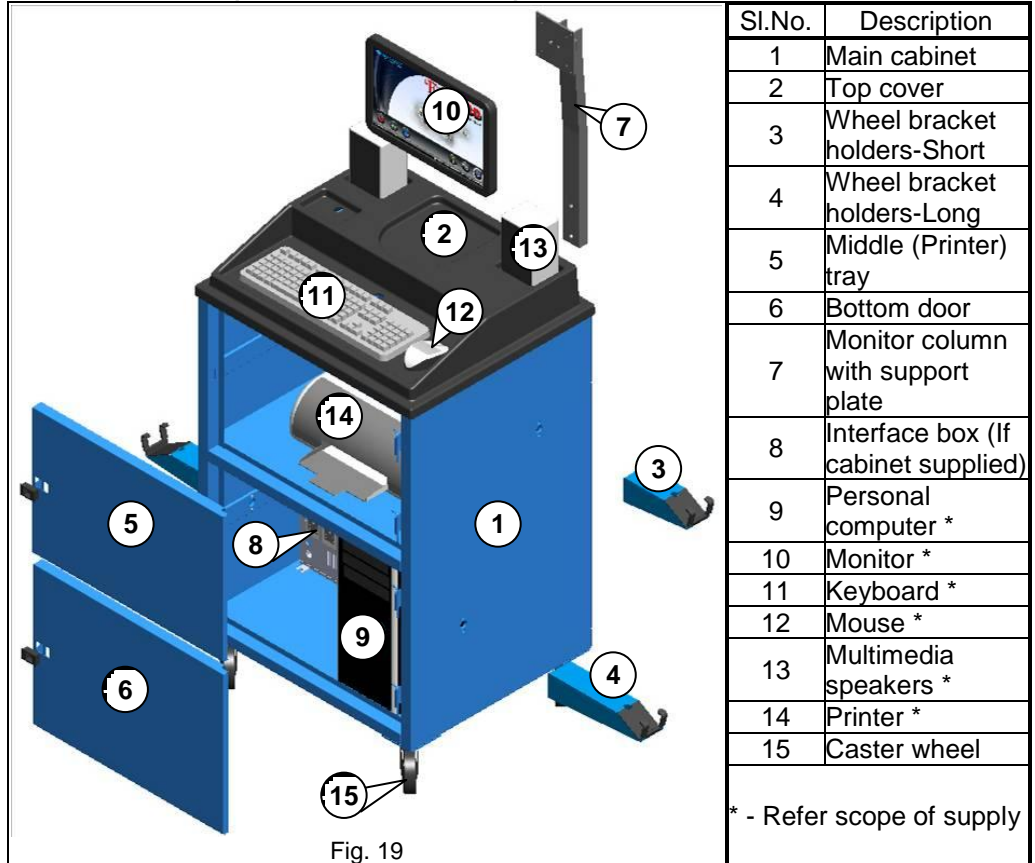

Fig. 18

4.1.3. MAIN CABINET (NA for In-Lift model)

Sl.No.	Description
1	Main cabinet
2	Top cover
3	Wheel bracket holders-Short
4	Wheel bracket holders-Long
5	Middle (Printer) tray
6	Bottom door
7	Monitor column with support plate
8	Interface box (If cabinet supplied)
9	Personal computer *
10	Monitor *
11	Keyboard *
12	Mouse *
13	Multimedia speakers *
14	Printer *
15	Caster wheel
* - Refer scope of supply	

Fig. 19

1. Fix Wheel bracket holders-Short & Long with Main cabinet. Place the Integrated Wheel bracket & Target plate in respective Bracket holders.
2. Fix the Monitor column at the rear side of Main cabinet using Allen screw, Plain washer & Spring washer (2 Nos. each). Fix the Monitor with Support plate in Monitor column.
3. Fix the Caster wheels (with Lock) with Front Caster wheel fixing plate beneath the Cabinet and fix the Caster wheels (without Lock) to rear Caster wheel plate. Place the Top cover over the Main cabinet and fix it.

4.1.4. PC ACCESSORIES COLUMN (For Drive Through model)

1. Fix the Monitor column (1), CPU tray (2), Keyboard tray (3), Printer tray (4), Wheel bracket holders Long (5) & Short (6) with the Column (7) as shown below:
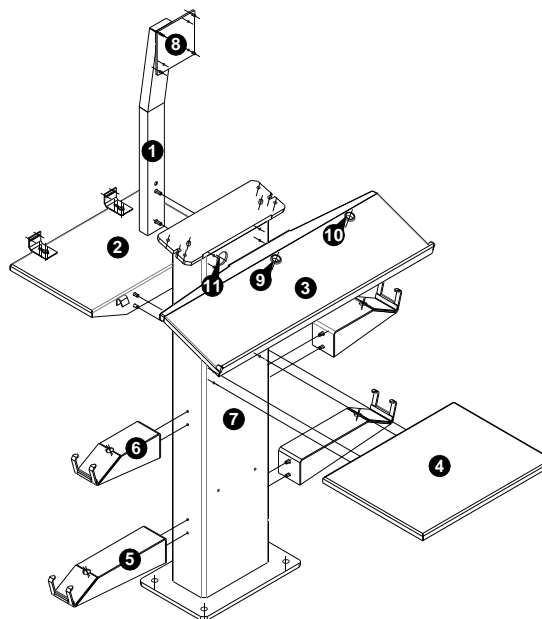

Fig. 20

NOTE: Interface box will be fixed with the column at Factory itself

4.1.5. PC ACCESSORIES COLUMN (For In-Lift model)

1. Fix the Monitor stand (1), CPU tray (2), Keyboard tray (3) & Printer tray (4) with the Accessories Column as shown:

   NOTE: Interface box (5) will be fixed with the Accessories column at Factory itself

2. Place the assembled PC accessories column at the right side of the lift to facilitate alignment of Right hand steering drive vehicles. In case of left hand steering drive, place the column at left side.

3. Fix column using Anchor bolt in its location after calibration of left & right camera vertical column on lift.

   NOTE: Excessive pounding will deform the Anchor bolts & make future service difficult
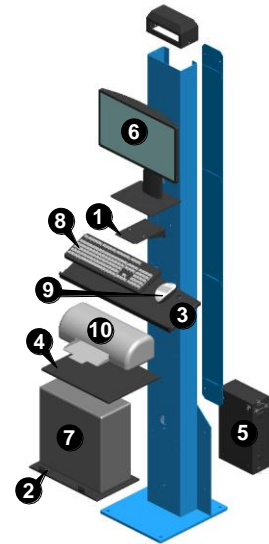
Fig. 21

4.2. FOUNDATION

4.2.1. VERTICAL COLUMN (Applicable only for PT / VH / AVH models)

1. Draw a centre line centre (geometric centre line) to the alignment pit/lift.

2. Make a mark at 2mtr from the Left and Right Rotary plates centre. Place the Vertical column centre on the centre line to the alignment pit/Lift along the 2mtr line.

   For DT model, place the Accessories mounting Vertical column at the geometric centre line 2000mm from the Rotary plate centre.

3. Place the Horizontal beam over the Vertical column bracket. Tighten the bolt provided on the Horizontal beam. Use shims below the vertical column base to level the Horizontal beam using water tube level.

   For DT model, Place the Camera mounted Left & Right side Vertical columns at the respective sides of the pit at the centre of marked location (2000mm from Rotary plate centre & 1210mm from geometric centre line). Ensure the floor levels where Camera mounted Vertical columns are to be installed.

4. Use two plumb near the Left and Right camera covers to create horizontal beam reference point to measure the physical distance as shown below:
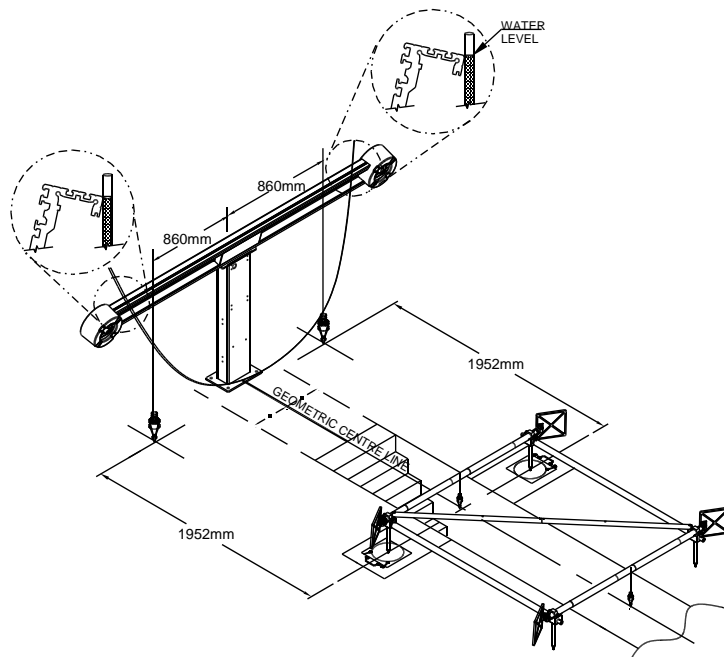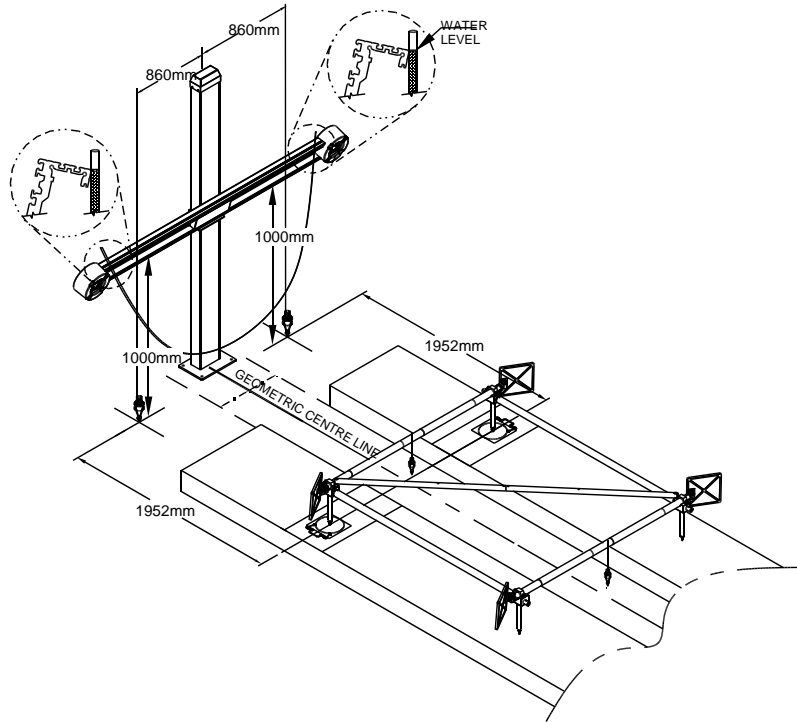
   PT model

Fig. 22

VH / AVH model

860mm

860mm

WATER LEVEL

1000mm

1000mm

1952mm

GEOMETRIC CENTRE LINE

1952mm

Fig. 23

Drive Through model

1210mm

2000mm

1210mm

GEOMETRIC CENTRE LINE

1210mm

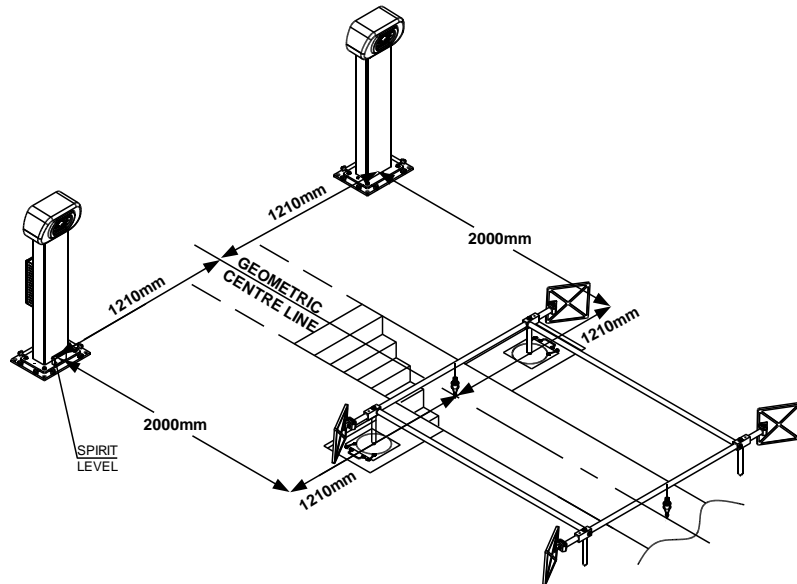2000mm

SPIRIT LEVEL

1210mm

Fig. 24.

5. Level the Vertical column base plate in X, Y & Z axis direction. Use shims below the vertical column base, if required.

6. Tie the pendulum near the Left and Right camera covers.

7. Adjust the Horizontal beam assembly so that the pendulum matches with the 2.0 meter mark line. Ensure the Vertical column centre matches with the centre line of the alignment pit/lift.

8. Using a Hammer drilling machine equipped with a 12mm concrete drill bit, bore the 4 holes in the vertical column base. Clean the dust in the foundation area and holes. Fix the Anchor bolt in the holes. Recheck the horizontality of beam using water tube level & verticality of column using spirit level in Z axis in the base plates. Tighten all the nuts.
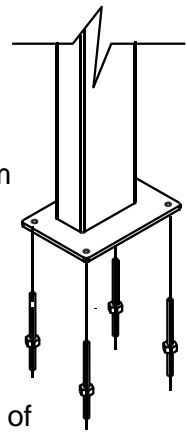
Fig. 25

☞ **Excessive pounding will deform the Anchor bolts and make future service difficult**

4.2.2. WALL MOUNTING BRACKET

👉 **Wall (Brick or concrete) has to be ensured for its strength to hold anchor bolt. The entire beam load will act on anchor bolts only**

1. After evaluating the space available in the alignment bay, decide the Wheel base (B), Distance between Camera to Rotary plate centre (D) and Camera height that can be accommodated as per the table given below:
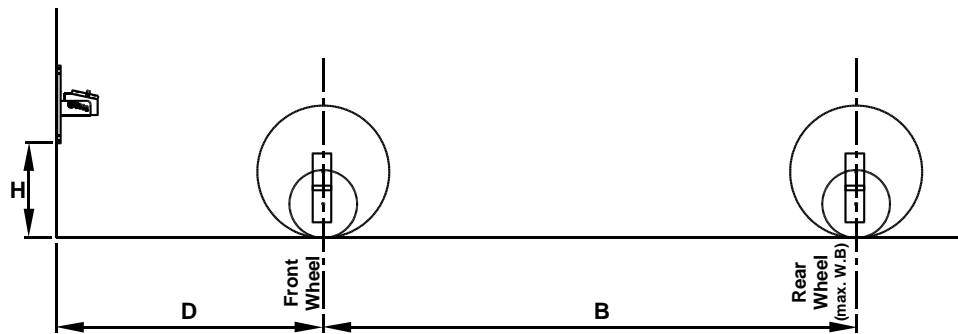

Fig. 26

Wheel base (in mm) (B)	Distance between Camera & Rotary plate centre (in mm) (D)	Camera height (in mm)	Required Tilt angle to be set in Wall mount bracket	Required Height to be maintained between Wall mount bracket bottom & Ground to meet the Camera height (in mm) (H)
4000	2000	1000	12°	787
4000	2000	1000	15°	792
		1100		892
3900	2100	1200		992
4000	2000	1300	19°	1099
3800	2200	1400		1199
3700	2300	1500		1299
3800	2200	1600	22°	1405
3700	2300	1700		1505
3500	2500	1800		1605

2. Now, tilt the Beam mounting plate to match its locking hole with the respective hole (punched with angle) in bracket and lock the position by inserting Allen screw (M6x25) and fix it using Plain washer & Nut at inner side of bracket.

3. After assembling the Wall mount bracket with required tilt, mark the centre line of the Pit and extend the line up to wall.

4. Make a mark at 2mtr from the Left and Right Rotary plates centre.

5. Place the Bracket centre on the centre line to the alignment Pit/Lift along the 2mtr line. Use two plumbs to create reference point to measure the physical distance.

6. Place the Wall mount bracket on the wall perpendicular to pit by maintaining the decided height & Distance between Camera to Rotary plate centre. Use Tube level at the tapered edges of Beam mounting plate to ensure its horizontality.

7. Mark 4 holes on the wall & drill the holes using Drilling machine.

8. Fix the Anchor bolt by using hammer.

9. Mount the Wall mount bracket on wall and tighten the nuts.

4.3. COMPUTER & PERIPHERALS INTEGRATION

4.3.1. PT / VH / AVH MODEL
1. Place the Desktop PC in the CPU tray.
2. Place the Keyboard and the Mouse on the Keyboard tray. Feed the cables through the hole in the tray.
3. Place the Printer on the Printer tray (Optional). Ensure Toner cartridges and papers are loaded.
4. Place the Speakers over the tray (Optional).
5. Fix the Monitor with Monitor fixing support plate.
6. Route the cables from each of the above peripherals to the rear of the PC through the routing hole provided in the Vertical column.
7. Route the Camera USB cable to PC & IR LED power cable to Interface box.

4.3.2. VH / AVH MODEL WITH MAIN CABINET
1. Fix the Monitor column at the rear side of Main cabinet.
2. Fix the Monitor with Support plate in Monitor column.
3. Place the Printer (refer scope of supply) inside the Middle tray.
4. Place PC inside the Bottom compartment of Main cabinet.
5. Place the Keyboard, Mouse & Multimedia speakers (Optional) over the respective cavities in Main cabinet top cover.
6. Route the cables from each of the above peripherals to the rear of the PC through the routing hole provided in the Top cover.
7. In case of AVH, remove the Distribution panel safety cover from the rear side of Main cabinet.
8. Route the Camera USB cable to PC & IR LED power cable to Interface box/Distribution panel.

4.3.3. DRIVE THROUGH MODEL
1. Fix the Monitor with Support plate (8) in Monitor column.
2. Place the Desktop PC on the CPU tray.
3. Place the Keyboard and the Mouse on the tray and feed the cables through the respective hole (9&10) in the Top cover.
4. Place the Printer (Optional) over the Printer tray. Ensure Toner cartridges and papers are loaded.
5. Route the cables from each of the above peripherals through the hole in Vertical column (11) to the rear of the PC and connect it.
6. Connect the PC & peripherals power cable with Interface box.

4.3.4. IN-LIFT MODEL
1. Fix the Monitor (6) in Monitor stand.
2. Place the Desktop PC (7) on the CPU tray.
3. Place the Keyboard (8) and the Mouse (9) on the Keyboard tray and feed the cables through the respective hole in the tray.
4. Place the Printer (10) (Optional) over the Printer tray. Ensure Toner cartridges and papers are loaded.
5. Route the cables from each of the above peripherals through the hole in Vertical column to the rear of the PC and connect it.
6. Connect the PC & peripherals power & signal cables with Interface box as per the Routing diagram.

4.4. ROUTING
Perform wiring connections per Routing diagram given below:

4.4.1. PT / VH MODELS
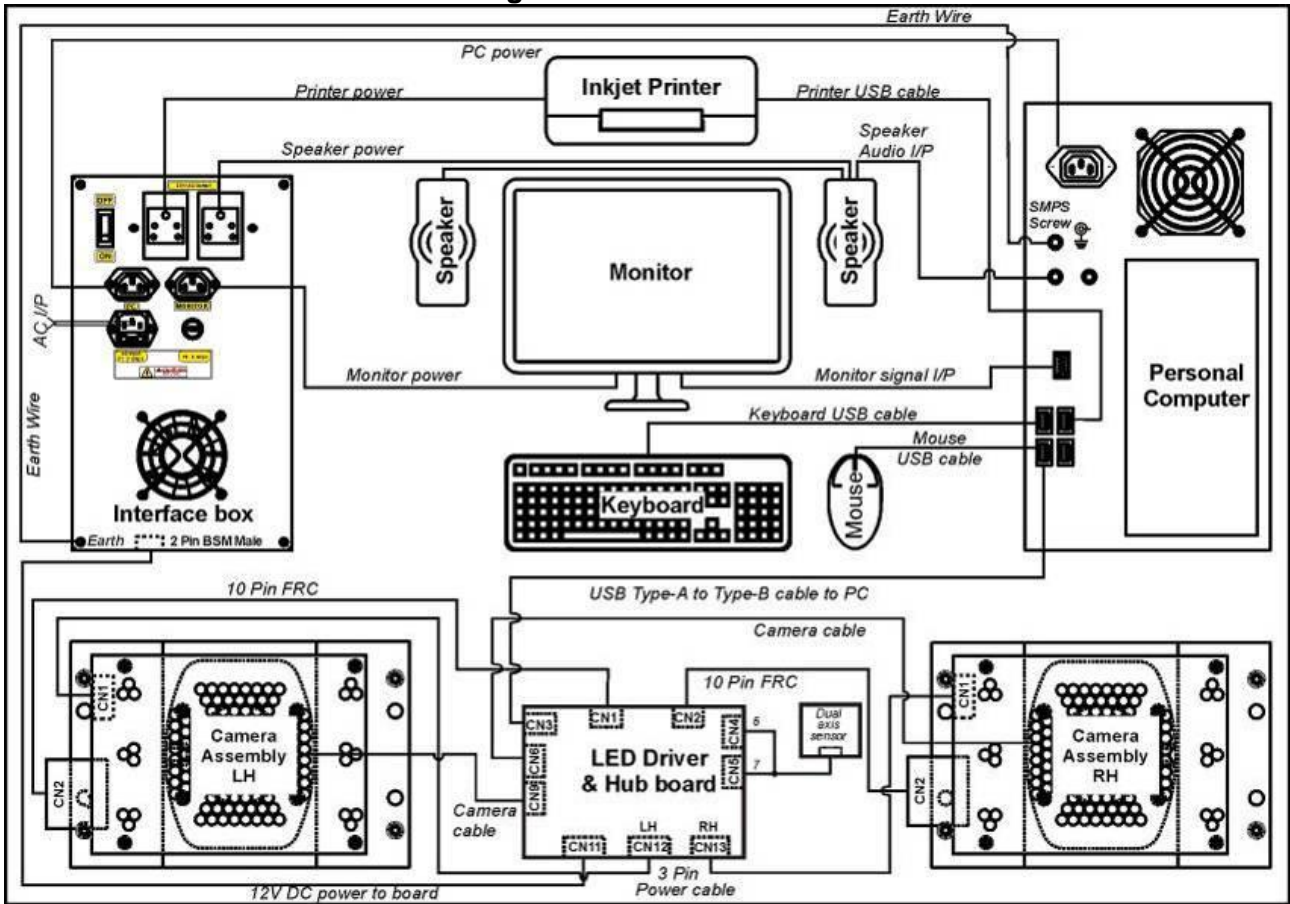#### For USB2.0 configurations

Fig. 27

For USB3.0 configurations
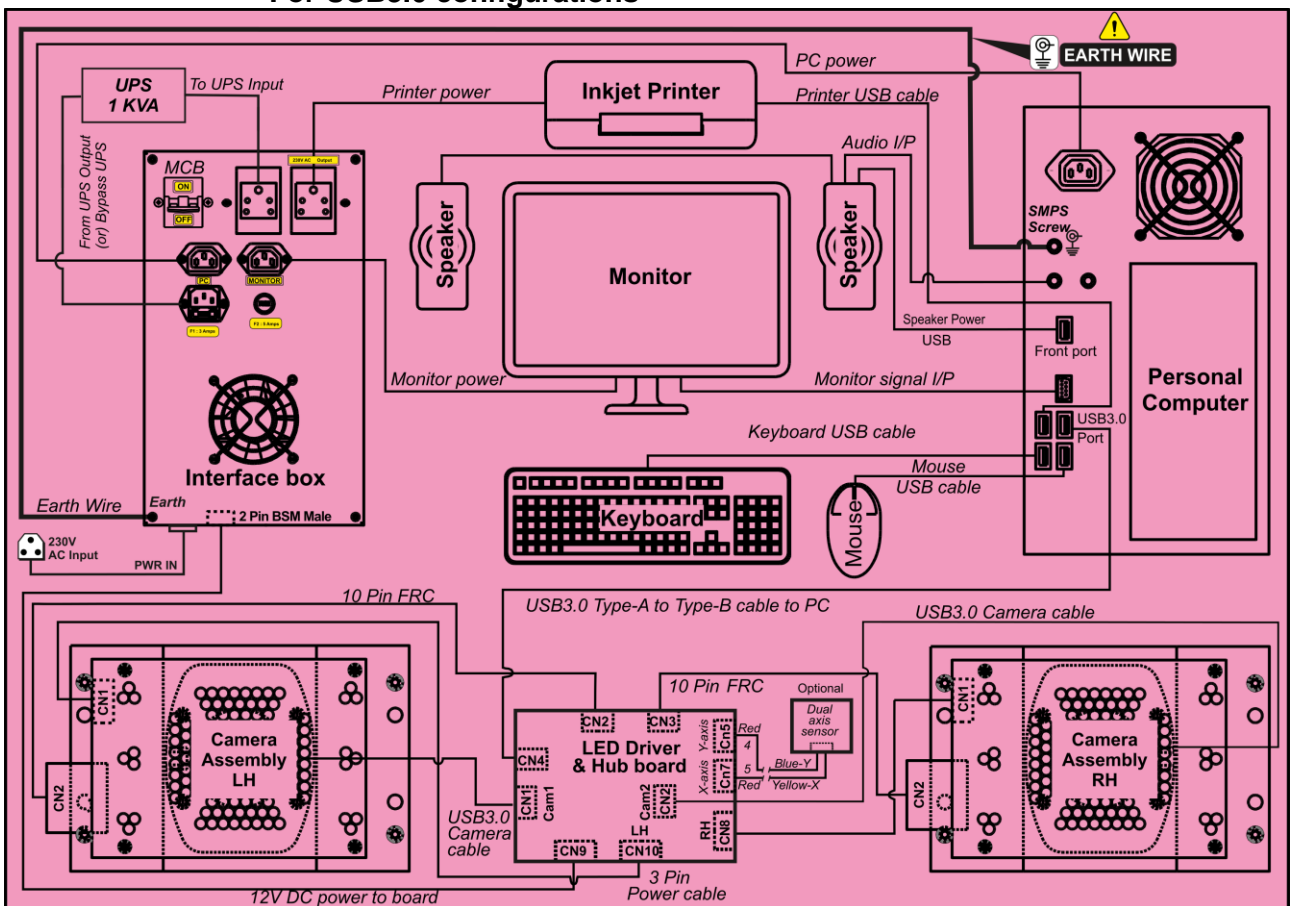

Fig. 28
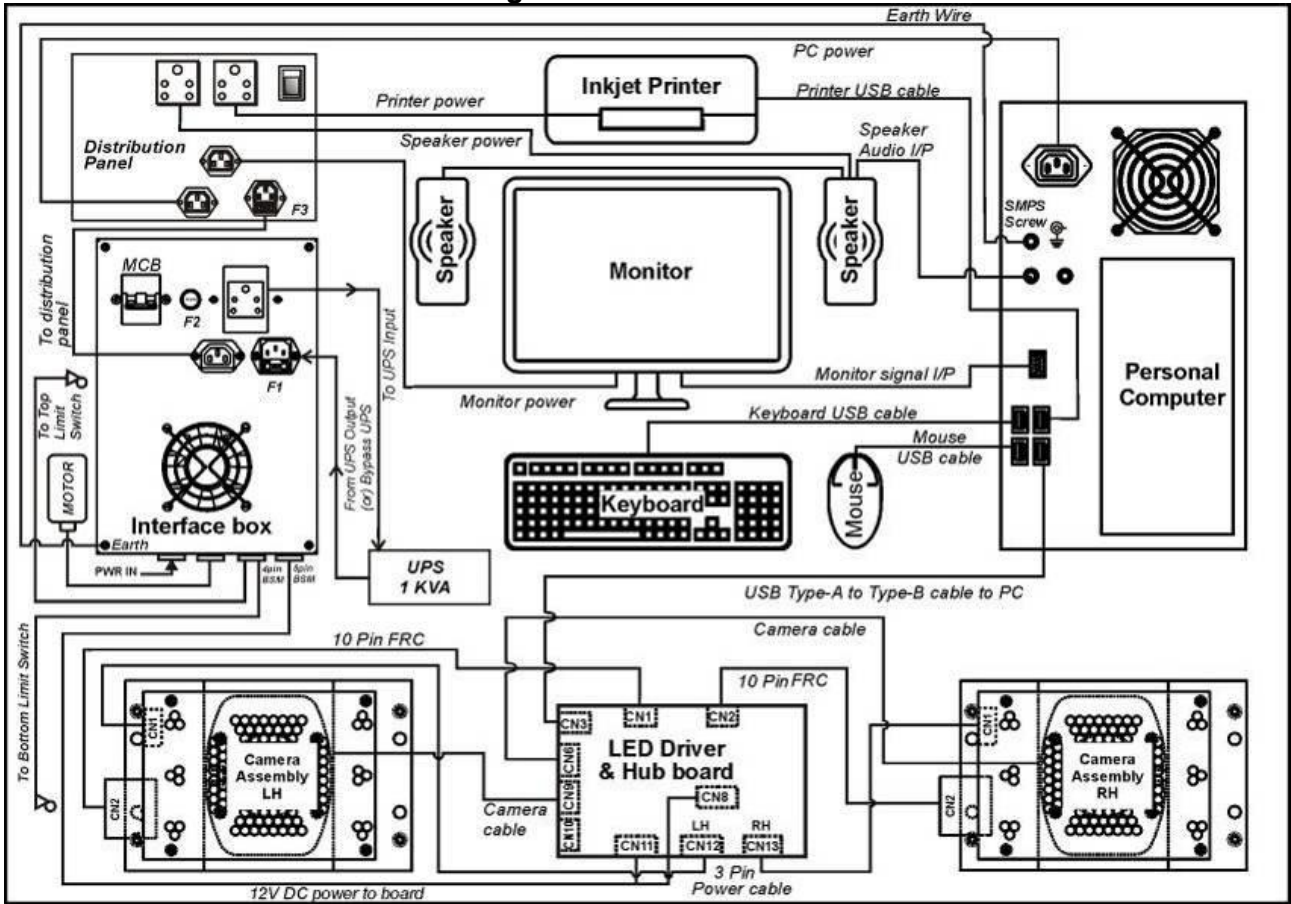
4.4.2. AVH MODEL

For USB2.0 configurations

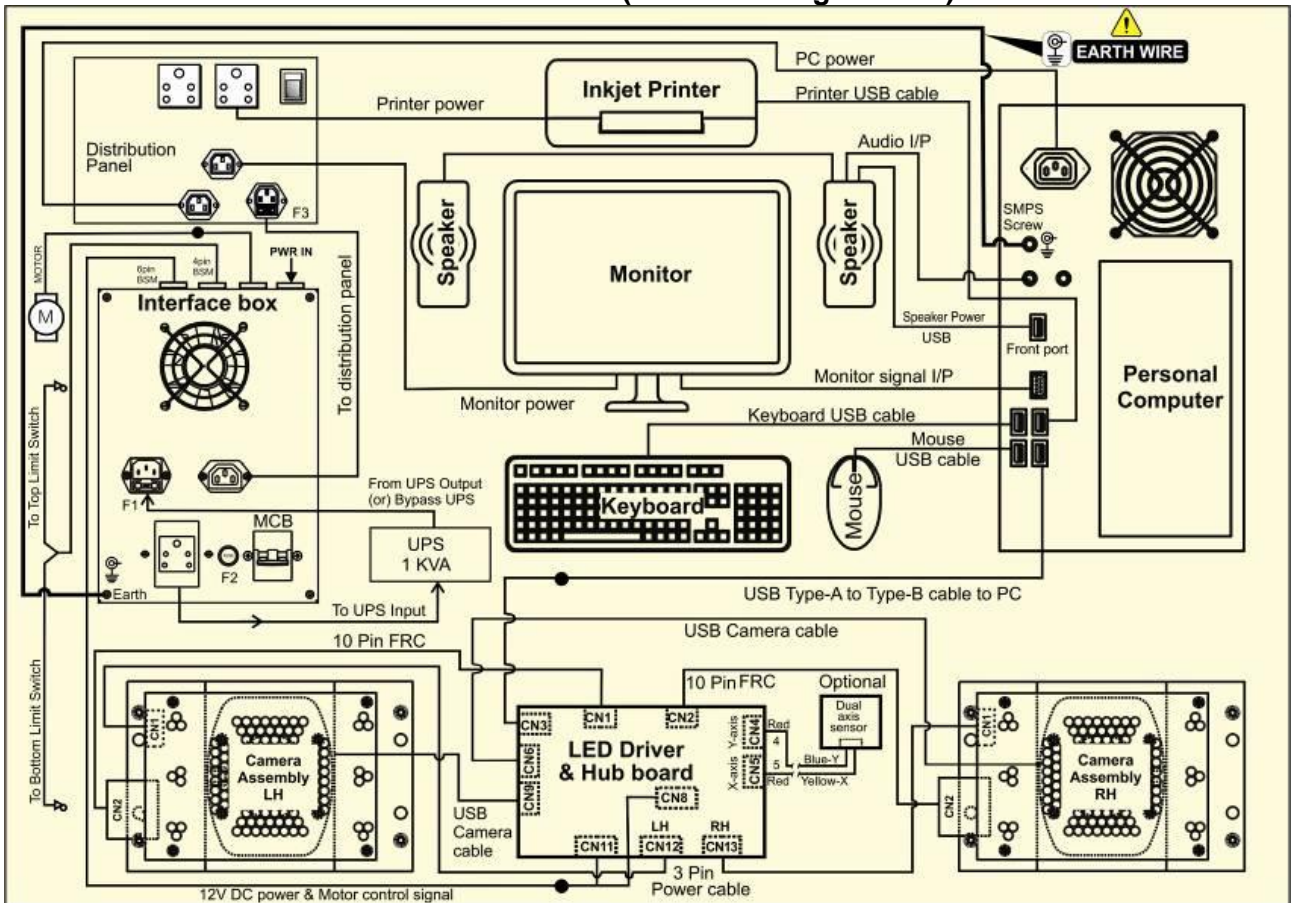
Fig. 29

For AutoBoom V4 model (USB2.0 configurations)

Fig. 30

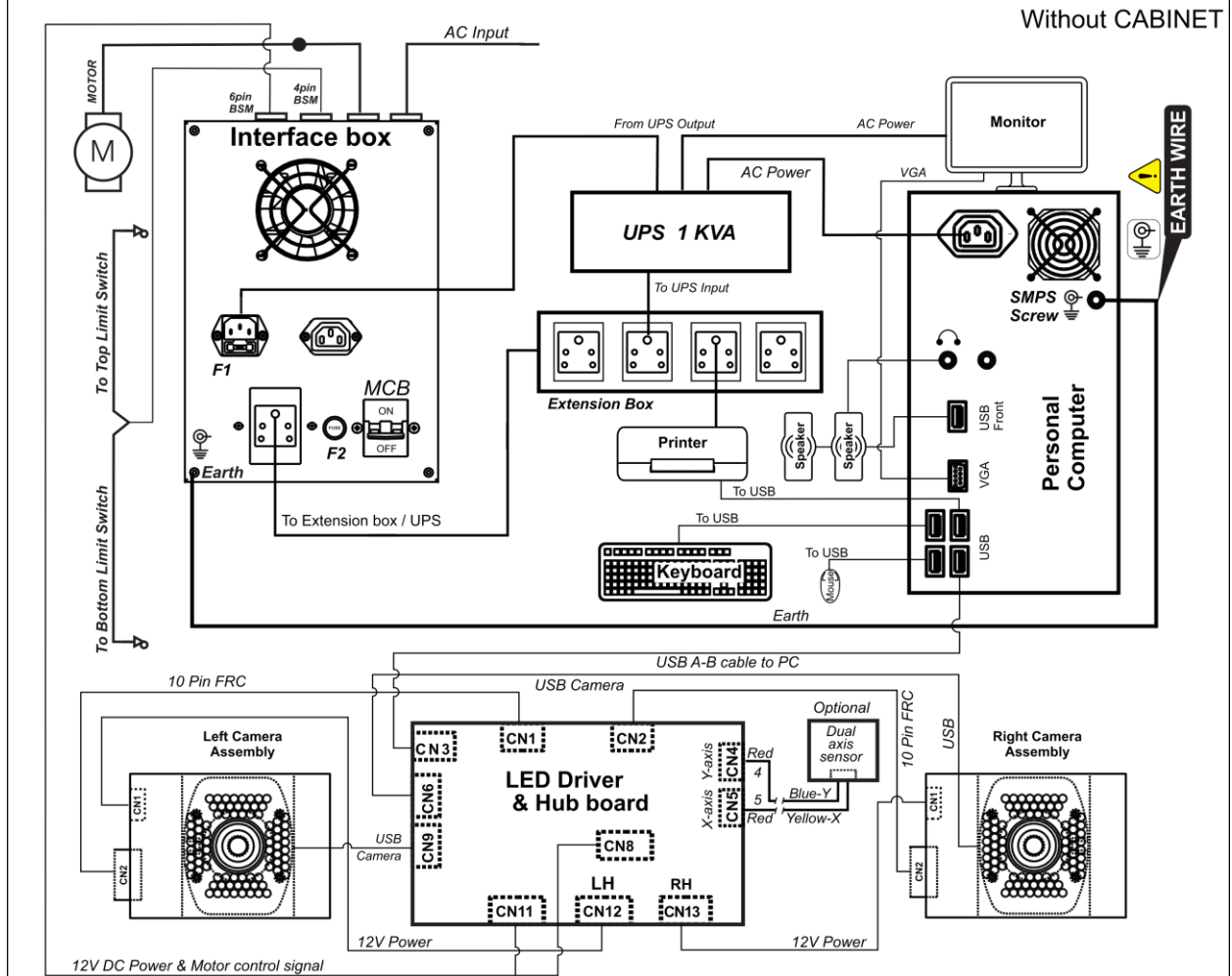# For AutoBoom V4 model W/O Distribution panel (USB2.0 configurations)
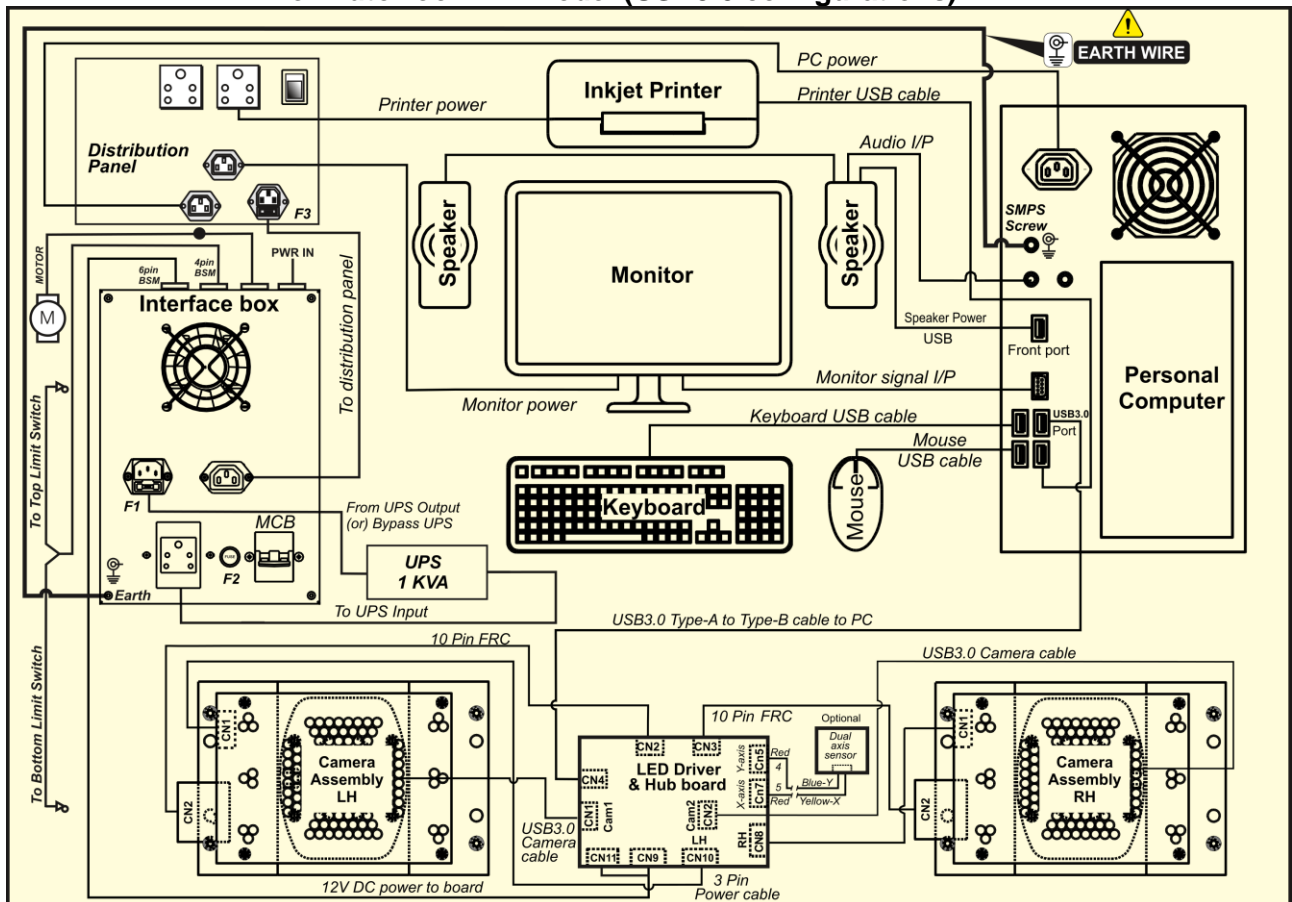
Without CABINET

Fig. 31

For AutoBoom V4 model (USB3.0 configurations)
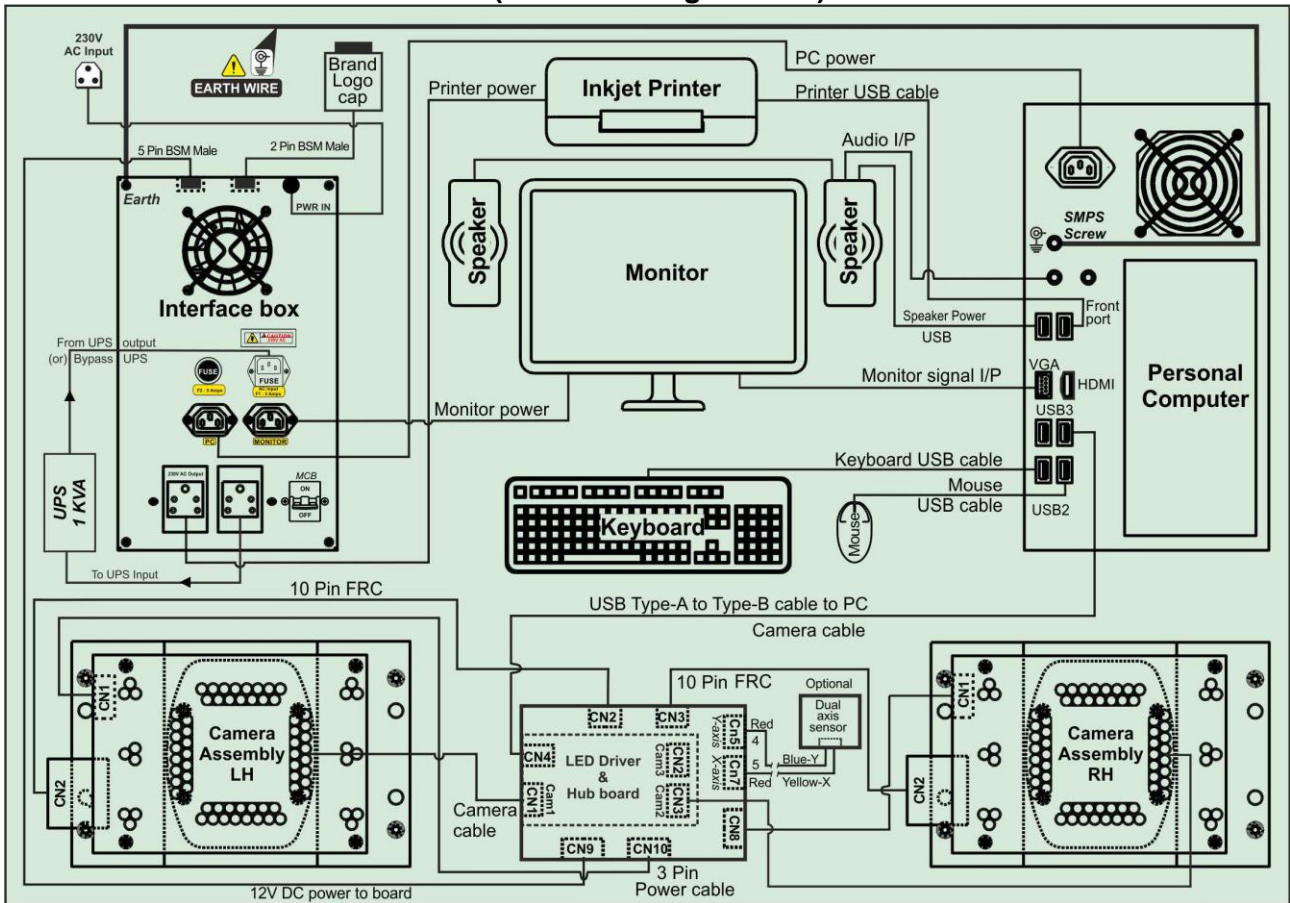

Fig. 32

4.4.3. DRIVE THROUGH MODEL (USB3.0 configurations)
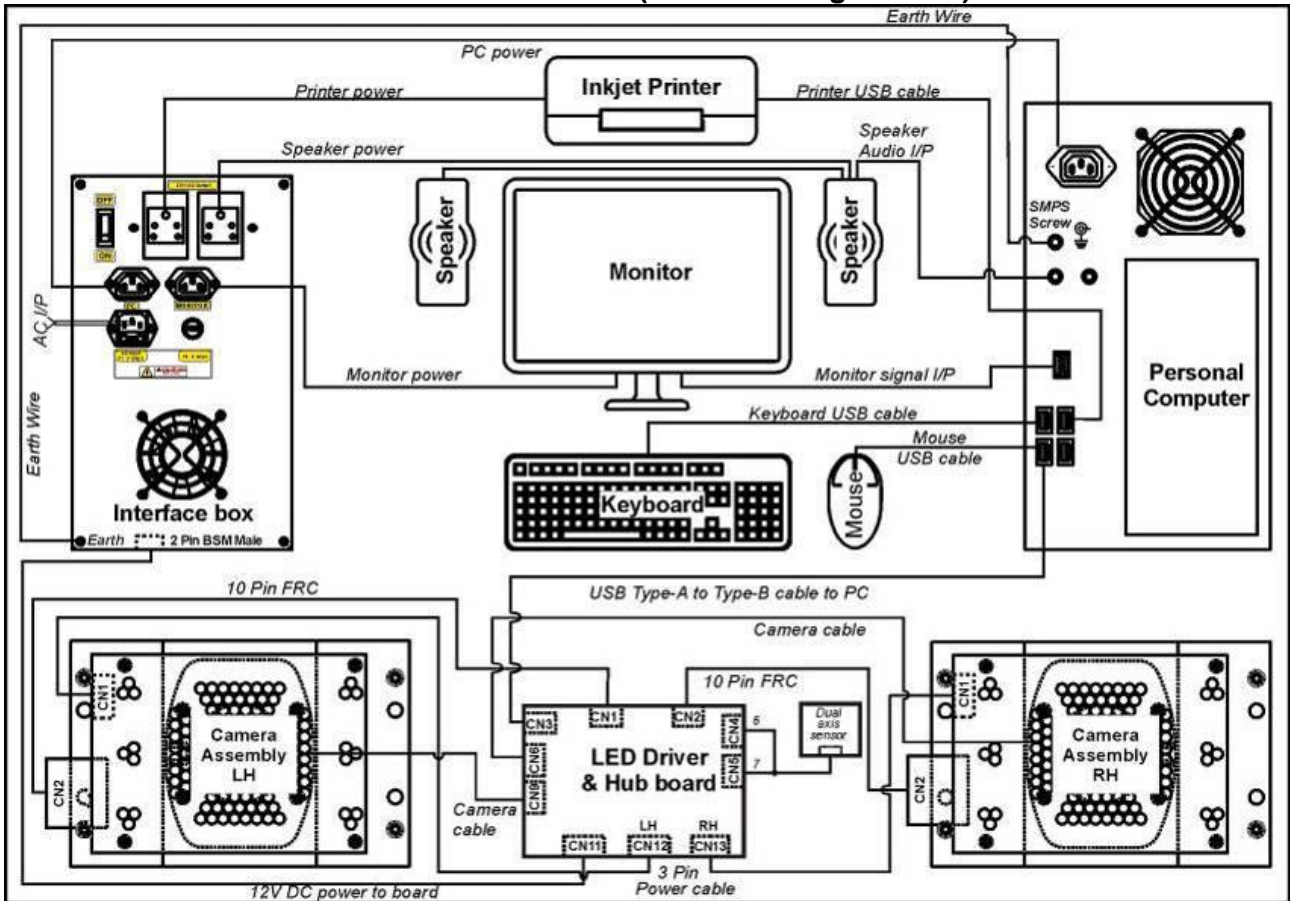
Fig. 33

Route the Camera USB cable, FRC cable & IR LED board power cable from right side Vertical column through the concealed pipe (Ø1.5") and connect with LED Driver & Hub board in the Hub board box fixed in left side Vertical column as shown below:
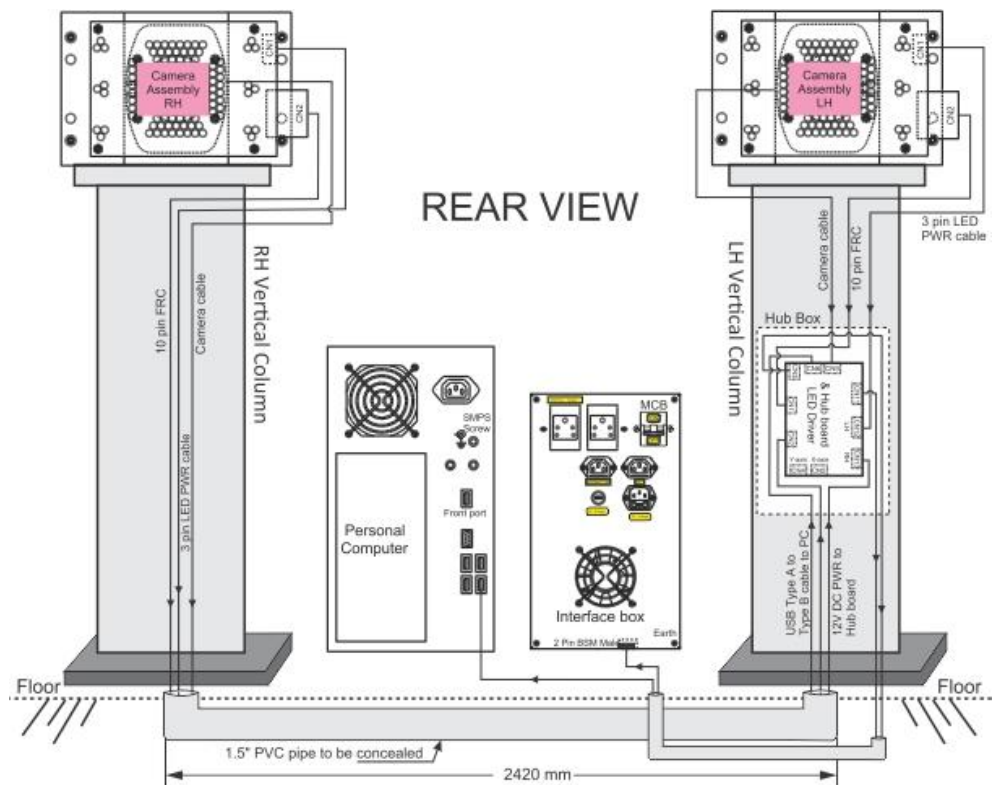
Fig. 34

Route the Camera USB cable and IR LED power cable from the Hub board box in left side Vertical column through the concealed pipe (Ø1.5") that leads to Accessories mounting column and connect it with PC & Interface box respectively as shown above.

4.4.4. IN-LIFT MODEL (USB3.0 configurations)

Fig. 35

Route the Camera USB cable, FRC cable & IR LED board power cable from right side Camera column to the Left side Camera column through the Cable routing tube and connect the IR LED power cable to LED Driver board and Camera USB cable & FRC cable to Hub board in the Panel fixed in left side Camera column as shown below:
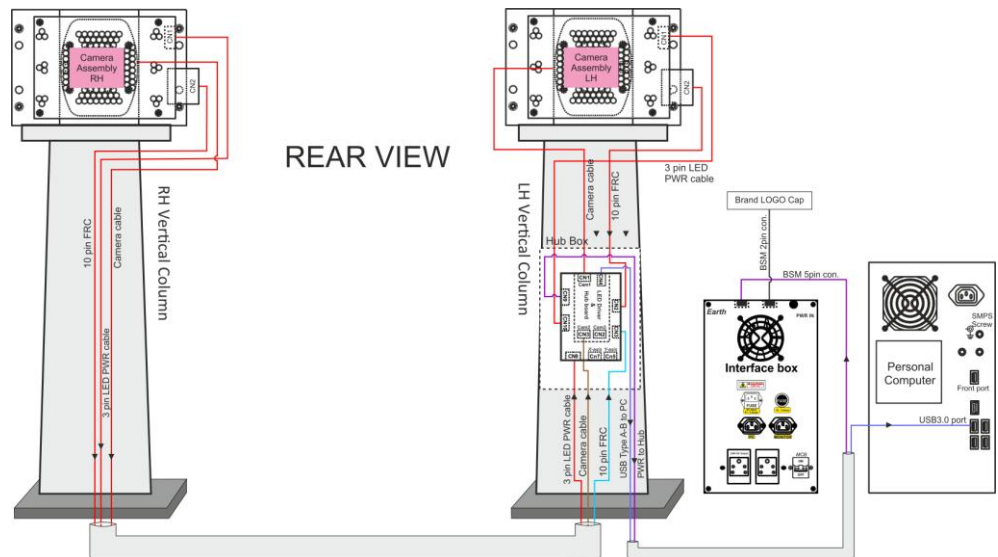

Fig. 36

Route the assembled cable (5mtr) along with Hub board power cable from the Hub board panel in left side Vertical column through the Wire routing pipe that leads to PC Accessories column and connect it with PC & Interface box respectively as shown above.

5. DESCRIPTION OF MAIN PARTS

5.1. CAMERA BEAM / COLUMN

For PT / VH / AVH models

The Horizontal beam consists of the Camera-LH, Camera-RH, IR LED board-LH, IR LED board-RH and LED Driver & Hub board assemblies. Connect the following two cables coming from Horizontal beam as given below:

➢ +12V supply cable to the Interface box
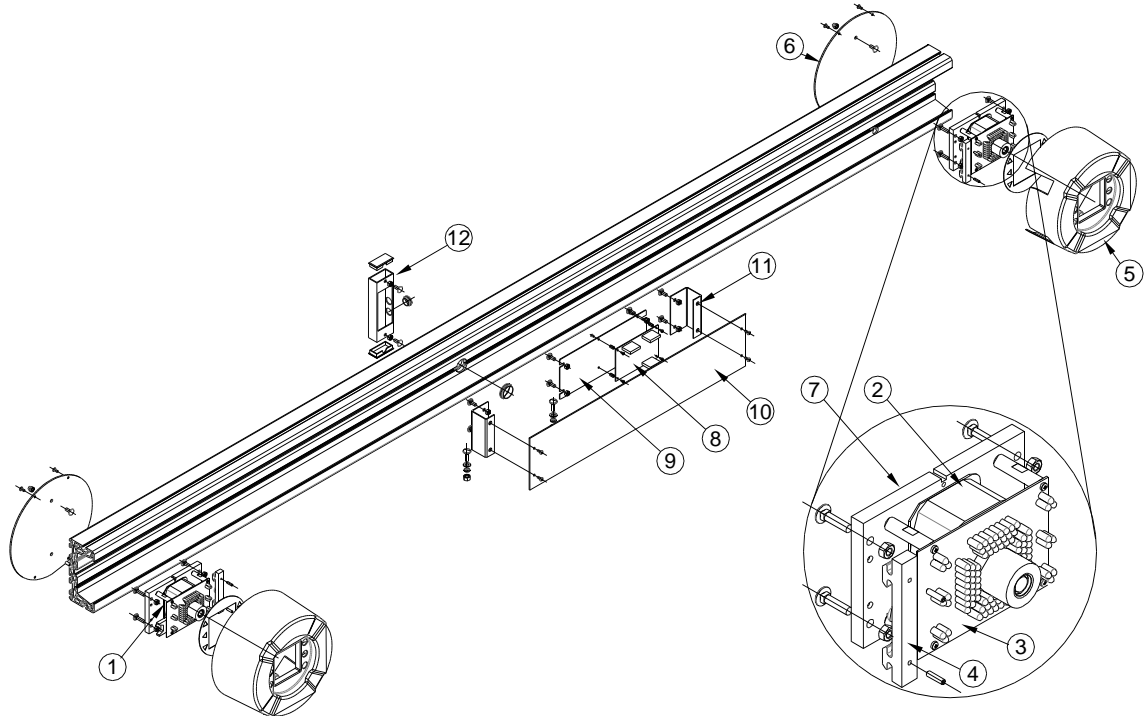➢ USB cable to the USB port of PC

Fig. 37

Sl.No.	Description	Sl.No.	Description
1	Camera-LH	7	Camera plate
2	Camera-RH	8	LED Driver & Hub board
3	IR LED board	9	Hub board plate
4	Camera locator block	10	Hub board cover
5	Camera cover	11	Hub board cover clamp
6	Camera cover back plate	12	BSM connector tube

For DT / In-Lift models

The Camera-LH & Camera-RH are fixed to the respective vertical columns.

5.1.1. CAMERA (LH & RH)

Camera is used to acquire the image reflected from Target plate.

The Camera used in 3D Wheel aligner is a high resolution SI (Scientific Imaging) camera with USB port. Left side Camera is mounted in such a way that the image viewed on the Monitor will be upside right (Straight picture). Right side Camera is mounted in inverted position. Hence the image will be upside down. The Camera is integrated with IR Filter to block the ambient light and allows only the IR lights.

The camera and Lens along with IR filters are calibrated for linearization at factory using special purpose equipment. *It is set at factory itself and It should not be opened or dismantle the lens from the Camera*. If it is dismantled, then the angle and distance measurement will go wrong and the entire wheel alignment/measurement will be improper. In case of Camera replacement, the entire camera setup (with factory calibrated) should to be replaced.

Both the LH & RH Camera are routed through LED Driver & Hub board and connected to PC.

5.1.2. IR LED BOARD

IR LED boards are used to emit high intensity Infra-Red light focused to the Front and Rear Target plates.

IR LEDs are loaded on each board. The IR light falls on the Target plate and the reflected image will be captured by the Camera.

A group of Blue LEDs are loaded on this board, which are used to indicate the direction during the wheel alignment sequence.

Red LEDs are provided in each Board to function as Stop indicator during Wheel Runout (PPR) & Caster swing sequence

The boards have Control signal connector (10Pin FRC) and Power connector (3Pin Phoenix). The Power connector carries Gnd, IR volts (8V-9.5V) and +12V. The IR volt is the input for IR LEDs. +12V is used for Blue & Red LEDs.

Fig. 38

5.1.3. LED DRIVER BOARD & HUB BOARD

USB2.0 LED DRIVER BOARD & HUB BOARD

The LED Driver board & Hub board has Microcontroller which is interfaced with the PC through built-in USB HUB module to receive the commands from the PC and then controls the IR LED board intensity based on the requirement and drives the Blue & Red LEDs whenever the alignment program requires. The Input supply voltage is +12Volts from SMPS. This board has two adjustable Regulators for IR LED board.

The Trimmer pot (TR1) is to be adjusted to get 9V on Pin2 of connector (CN6) for the Left IR LED board intensity to cover seven metre distance from the Left Camera to rear Target plate.

The Trimmer pot (TR2) is to be adjusted to get 9V on Pin2 of connector (CN5) for the Right IR LED board intensity to cover seven metre distance from the Right Camera to rear Target plate.

Three ports are used in the USB hub module for Camera-LH, Camera-RH and the Microcontroller (integrated). The USB cable from the PC is connected to the input of Hub module.

USB3.0 HUB BOARD

USB3.0 Hub board is used to connect all the cameras to this board and transfer the data to the PC.

It has one up stream USB3.0 type B Female connector which receives the data from the PC. There are three downstream connectors USB3.0 Type-A Female to connect the USB3.0 cameras. Both Top and Bottom Cameras are connected in two USB3.0 ports. One port is available as spare port. If any one of the port is not working, this free port can be used. The Hub board is stacked over the LED driver Board using board to board connector.
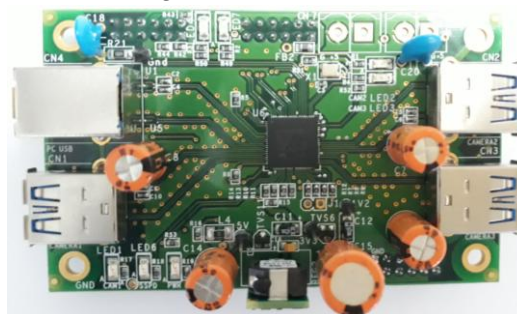
Fig.39

USB3.0 LED DRIVER BOARD

The functions of the LED driver board are given below:

1. To power up the IR LED whenever required during program sequence. The IR LED intensity is adjusted by this board depending on the distance from the Camera to Target plates.
2. To switch ON the Blue LEDs to indicate the direction during Push-Pull Runout and Caster swing (Turn Left & Turn Right operation).
3. To power up the RED LEDs whenever STOP indication is necessary.
4. To distribute the power supply required for IR LED boards.
5. Two FRC connectors to control IR LED board signals.
6. Two three pin connectors are provided to distribute the power required for the IR LED board.

Fig.40

5.2. INTERFACE BOX

It is a power distribution unit. 230VAC or 110VAC is connected to this box and Power outlets are provided in the panel to distribute required power to Desktop computer and peripherals.

The ON/OFF switch provided in Panel can be used to switch OFF complete power to the system after shutdown of the PC.

EMI Filter board and 60Watts SMPS are fixed inside the Interface box.

In AVH model, High voltage cutoff MCB is provided in the Interface box to protect the electronic assemblies from high voltage. This MCB is provided to switch off the entire equipment.

Following Control fuses are available in the Interface box as described below:

Control fuse   -   F1 is provided for protection of all electronic components in PC unit
Specifications – 3A, Dia 5mm x 20mm, Slow blow type Glass fuse
The Fuse will blow in 5 seconds (max.) for maximum current of 3A

Control fuse   -   F2 is provided for protection of
Monitor, Printer & Speaker (for PT/VH models)
Specifications – 5A, Dia 5mm x 20mm, Slow blow type Glass fuse
The Fuse will blow in 5 seconds (max.) for maximum current of 5A

Motor (for AVH model)
Specifications – 3A, Dia 5mm x 20mm, Slow blow type Glass fuse
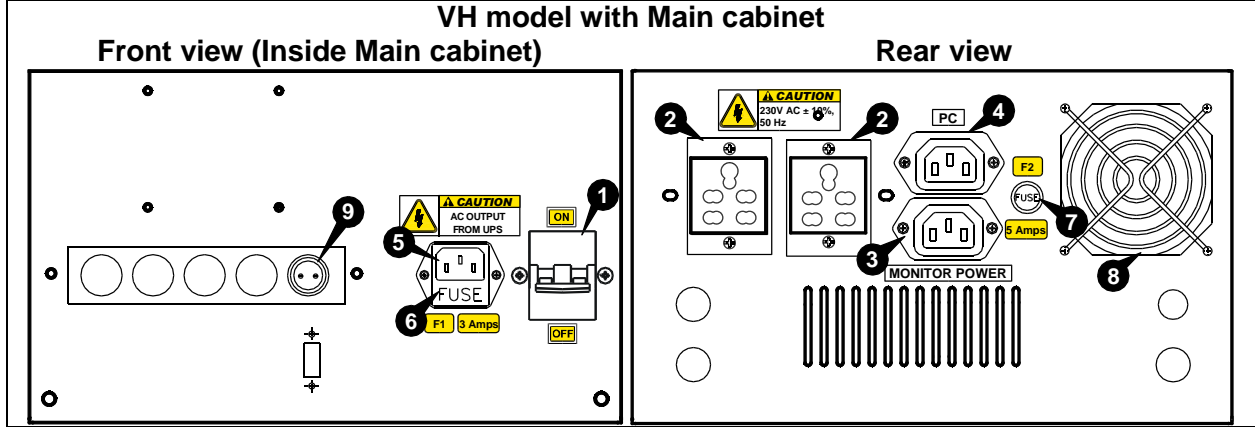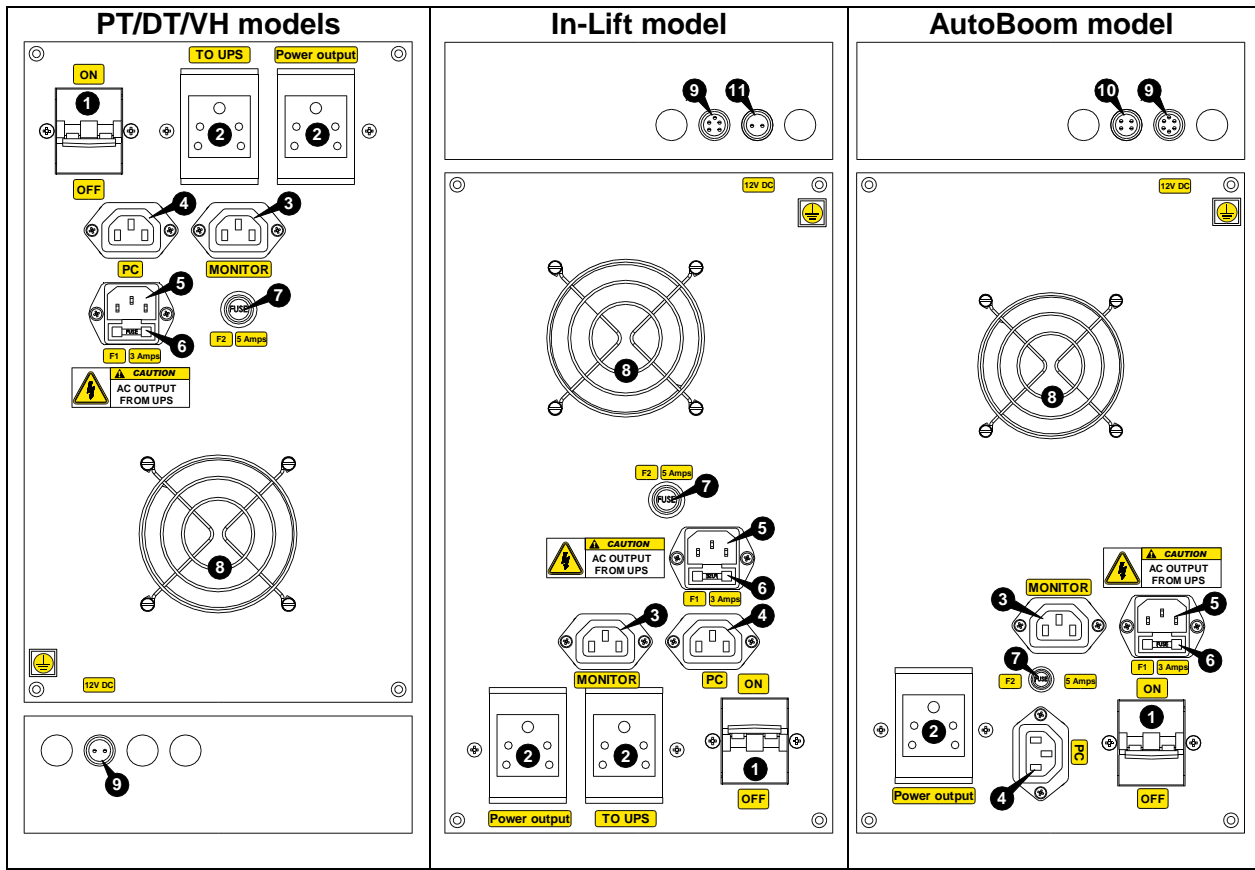*The Fuse will blow in 5 seconds (max.) for maximum current of 3A*

Fig. 41

SI.No.	Description	SI.No.	Description
1	MCB	6	Fuse (F1) For Interface box *(for PT/DT/VH/In-Lift models)* For PC unit *(for AutoBoom model)*
2	AC output To Printer & Speaker *(for PT/DT/VH/In-Lift models)* To UPS *(for AutoBoom model)*	7	Fuse (F2) For Monitor, Printer & Speaker *(for PT/DT/VH/In-Lift models)* For Motor *(for AutoBoom model)*
3	AC output To Monitor *(for PT/DT/VH/In-Lift models)* To Distribution panel *(for AutoBoom model)*	8	SMPS FAN
4	AC output for PC	9	DC power to LED Driver board
5	AC input for Interface box	10	DC power to Micro switch (AutoBoom)
		11	DC power to Top cover LED (In-Lift)

In AVH model, A Distribution panel is located at the rear side of cabinet for distributing the Power from Interface box to Desktop computer and peripherals.

The ON/OFF switch provided in the Panel can be used to switch OFF complete power to the system after shutdown of the PC.

Following Control fuse is available in Distribution panel as described below:

Control fuse   - F3 is provided for protection of PC peripherals

Specifications – 5A, ½", Slow blow type Glass fuse

Fuse will blow in 5 seconds (max.) for maximum current of 5A
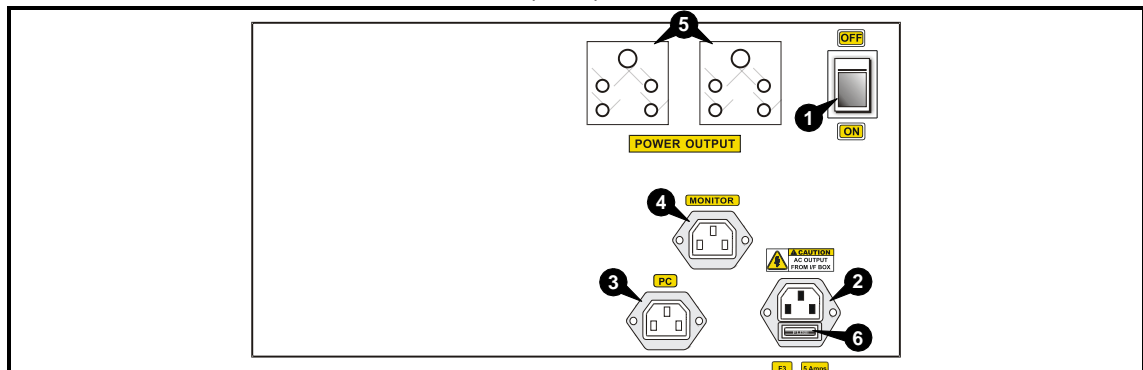
Fig. 42

Sl. No.	Description	Sl. No.	Description
1	ON/OFF DPST switch	4	AC output for Monitor
2	AC input for Distribution panel	5	AC output for Printer & Speaker
3	AC output for PC	6	Fuse (F3) for PC & Peripherals

5.2.1. EMI FILTER BOARD (applicable only for PT / VH / In-Lift models)
The EMI Filter board receives 230VAC or 110VAC and filters the electrical noise and clean AC power is delivered to the PC Peripherals. Refer the Wiring diagram (Chapter 10.2) for the electrical power distribution.

5.2.2. SMPS
The 60W SMPS generates 12VDC with 5ampere output. It is a wide operating voltage SMPS ranging from 90V to 270VAC / 47Hz - 63Hz input. The 12V is then distributed to Cooling fan, IR LED board and LED Driver & Hub board.

5.2.3. MOTOR CONTROL BOARD (applicable only for AVH model)
The Board contains EMI filter and Motor forward/reverse control section. The EMI Filter section receives 230VAC or 110VAC and filters the electrical noise and clean AC power is delivered to the PC Peripherals. Refer the Wiring diagram (Chapter 10.2) for the electrical power distribution.

The Motor control section turns On/Off the respective Triacs for forward & reverse direction of Motor. Also it distributes power to Monitor, Transformer & SMPS.

5.2.4. MOV BOARD (applicable only for AVH model)
The Metal Oxide Varistors are used between Line & Neutral to protect the system against I/P Over voltage / Surge / Spike etc.

5.3. TARGET PLATE
The Target plate is a specially designed accessory mounted with Wheel bracket. A Bubble Spirit level is fixed with it to ensure the vertical position. The Target plates are positioned with Wheel bracket in such a way that the patterned reflecting media on Target plate surface will reflect the IR light received from the IR Light source.

5.4.   VERTICAL COLUMN (AVH / AutoBoom model)

Vertical column is a Motor driven tower with Horizontal beam mounted on a bracket for positioning/adjusting the Beam automatically for various heights of Alignment lifts. The Motor housed at rear side of column drives the Bracket via Screw rod & Power nut.

A mechanical stopper is also provided in the Vertical column for manual intervention to stop the movement of Beam in case of any system failure.
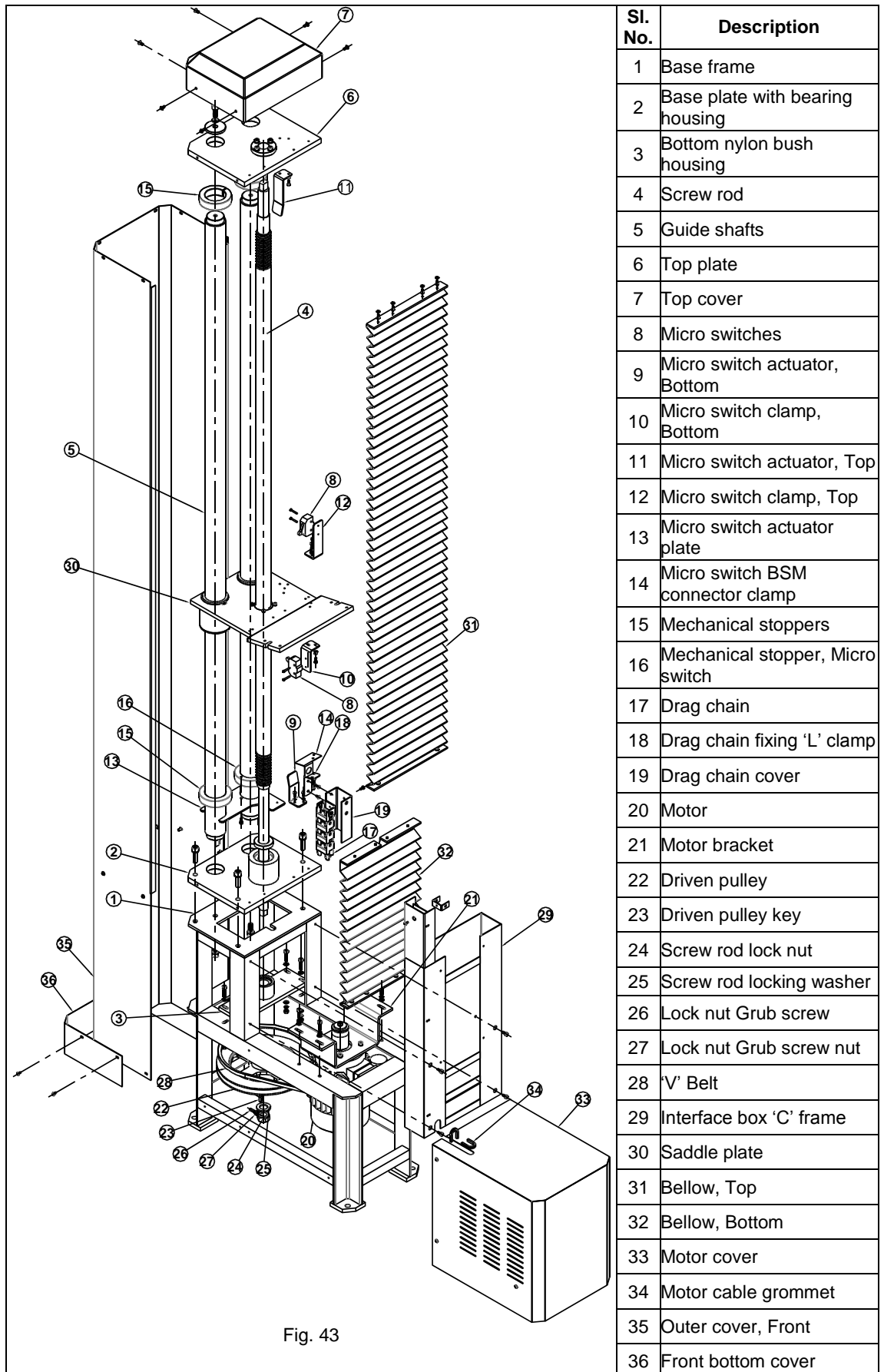
AVH model

Fig. 43

Sl. No.	Description
1	Base frame
2	Base plate with bearing housing
3	Bottom nylon bush housing
4	Screw rod
5	Guide shafts
6	Top plate
7	Top cover
8	Micro switches
9	Micro switch actuator, Bottom
10	Micro switch clamp, Bottom
11	Micro switch actuator, Top
12	Micro switch clamp, Top
13	Micro switch actuator plate
14	Micro switch BSM connector clamp
15	Mechanical stoppers
16	Mechanical stopper, Micro switch
17	Drag chain
18	Drag chain fixing 'L' clamp
19	Drag chain cover
20	Motor
21	Motor bracket
22	Driven pulley
23	Driven pulley key
24	Screw rod lock nut
25	Screw rod locking washer
26	Lock nut Grub screw
27	Lock nut Grub screw nut
28	'V' Belt
29	Interface box 'C' frame
30	Saddle plate
31	Bellow, Top
32	Bellow, Bottom
33	Motor cover
34	Motor cable grommet
35	Outer cover, Front
36	Front bottom cover

AutoBoom V4 model

DETAIL A
SCALE 1 : 2

M10 ALLEN BOLT &
NYLOCK NUT
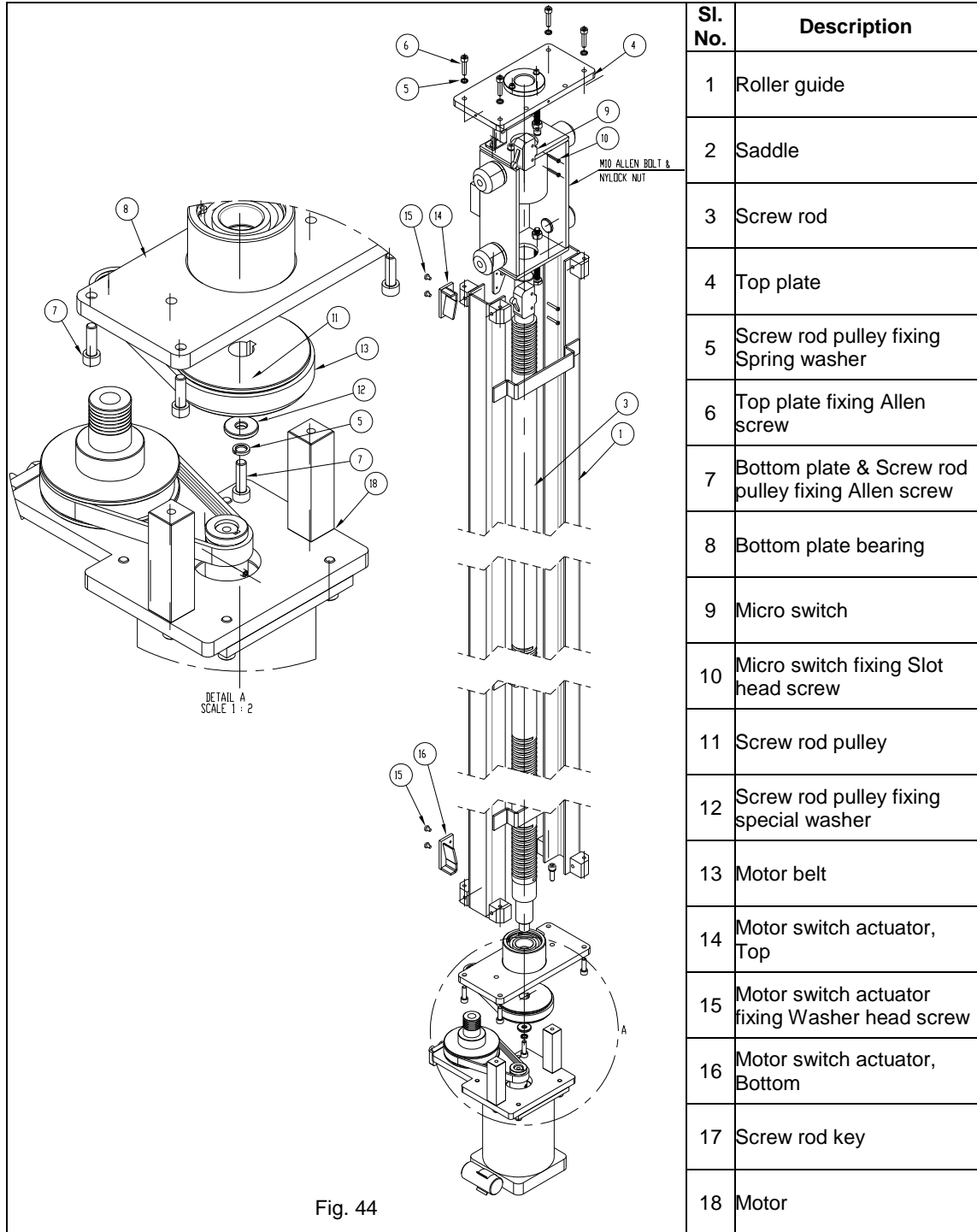
Fig. 44

Sl. No.	Description
1	Roller guide
2	Saddle
3	Screw rod
4	Top plate
5	Screw rod pulley fixing Spring washer
6	Top plate fixing Allen screw
7	Bottom plate & Screw rod pulley fixing Allen screw
8	Bottom plate bearing
9	Micro switch
10	Micro switch fixing Slot head screw
11	Screw rod pulley
12	Screw rod pulley fixing special washer
13	Motor belt
14	Motor switch actuator, Top
15	Motor switch actuator fixing Washer head screw
16	Motor switch actuator, Bottom
17	Screw rod key
18	Motor
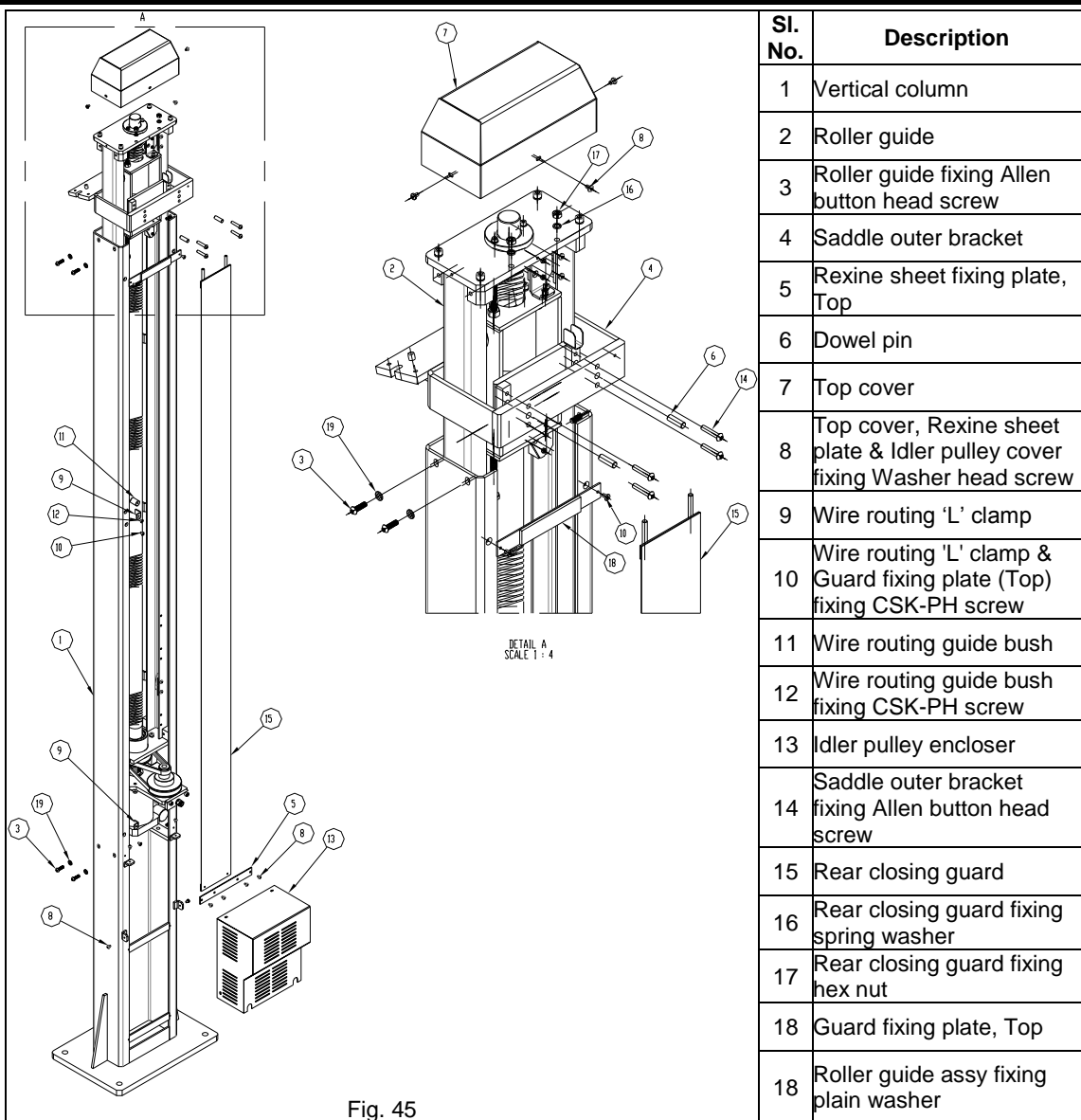
Sl. No.	Description
1	Vertical column
2	Roller guide
3	Roller guide fixing Allen button head screw
4	Saddle outer bracket
5	Rexine sheet fixing plate, Top
6	Dowel pin
7	Top cover
8	Top cover, Rexine sheet plate & Idler pulley cover fixing Washer head screw
9	Wire routing 'L' clamp
10	Wire routing 'L' clamp & Guard fixing plate (Top) fixing CSK-PH screw
11	Wire routing guide bush
12	Wire routing guide bush fixing CSK-PH screw
13	Idler pulley encloser
14	Saddle outer bracket fixing Allen button head screw
15	Rear closing guard
16	Rear closing guard fixing spring washer
17	Rear closing guard fixing hex nut
18	Guard fixing plate, Top
18	Roller guide assy fixing plain washer

DETAIL A
SCALE 1 : 4

Fig. 45

5.5. DESKTOP COMPUTER

☞ **AMD Processor is not recommended for 3D alignment system**

☞ **Anti-virus software should not be loaded in the Desktop computer**

Desktop computer is loaded with Windows Operating system and unique Align+ software. The alignment software processes the image acquired from Camera and converts the angle and distances using 3D imaging technology for display.

Processor	Intel Core i5 - Quad Core 6th / 7th Gen @ 3.2GHz (or) above
Mother board	Processor compatible Intel Genuine Mother board Audio : Built-in USB port : USB2.0 (4) & USB3.0 (2) (or) more Display port : DP / VGA / HDMI / DVI Ethernet : 10/100 Built-in
RAM	4GB DDR4 (or) above
Hard Disk Drive	1TB SATA (or) above
Optical drive	DVD R / RW SATA
Keyboard	USB
Mouse	USB Optical
Operating system	Windows 10 IOT

6. SOFTWARE INSTALLATION

☞ **Alignment software is pre-loaded in the Desktop computer if supplied with aligner. Software should be installed by authorised Service personnel only in case of re-installation or upgradation at customer premises**

Following are the software files which need to be installed / restored in the below mentioned sequence, in case of re-installation:

Sequence	File description	File location in HDD	File name
1	Windows 10 IOT	c:	-
2	Alignment PC software	c:\wheel aligner\	WA32Axxx.EXE
3	International vehicle data (Autodata) (Refer scope of supply)		Autodata_XXXX_XX_D1.exe
(*)	Data Manager	c:\wheel aligner\data\	Datamanager_3D.mdb
	Workshop information (Address, Password & Logo)		Align_3D.mdb
	Distance Calibration data		Calib_3D_L.mdb Calib_3D_R.mdb
	Camera Calibration data	c:\wheel aligner\	Camdata_L.dat Camdata_R.dat
	Target plate Calibration data		Calib_FL.dat, Calib_FR.dat Calib_RL.dat, Calib_RR.dat
	Vehicle data: US vehicle.data European vehicle data Brazilian vehicle data Indian vehicles data User vehicle data	c:\wheel aligner\data\ vehicledata	usdata.mdb Vehicledata.mdb brazildata.mdb indian.mdb userdata.mdb

NOTE: (*)   The indicated files will be restored/backed-up automatically via Restore calibration data options as explained in Chapter 7.7.8 of Operating manual. Also these files should be restored only after installation of Alignment PC software. Hence data backup should be taken prior to any software upgradation to facilitate restoration at later stage of installation.

6.1.   ALIGNMENT PC SOFTWARE
Pre-requisites: Before installation, make sure the following are performed:

☞ **PC should have "d:" partition with a minimum free space of 10GB, apart from "c:" partition**

☞ **DO NOT plug the USB cable from the Horizontal beam to the PC**

Select *Regional & Language setting* in *Control panel* and change the decimal symbol to dot "." & digit grouping as ",".

6.1.1.   STEP-1 : Windows OS installation
   For Windows7
   a)   Windows 7 OS is installed with proper Mother board drivers and Sound card driver.
   b)   Set Theme to "Windows 7 Basic" or "Windows Classic" in *Themes* menu by selecting "**Personalize**" in *Right click* option at Desktop as below:

Fig. 46
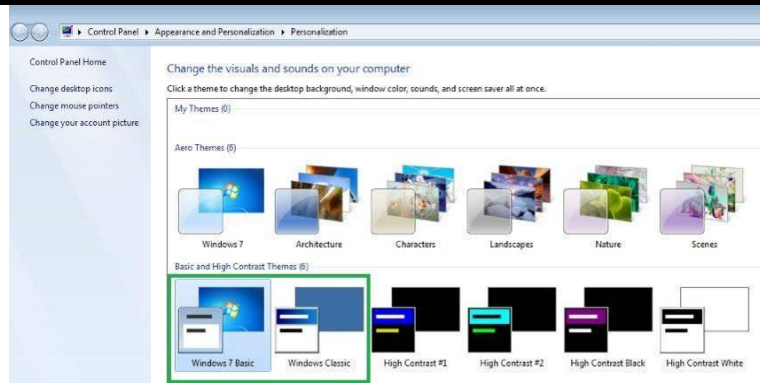
Fig. 47

For Windows8

a) Insert the 3D software installation CD.

b) Copy *Microsoft .NET Framework 3.5 Offline Installer.exe* and *WA32AXXX.exe* from CD to Desktop.

c) Remove the 3D software CD from CD Drive and insert Windows8 CD in the CD Drive.

d) *Right Click* Microsoft .NET Framework 3.5 Offline Installer and select "*Run as administrator*" option to execute the program as shown below:

Fig. 48

e) Select the CD drive name and click "*Start installation*" button on the screen to install .Net Frame work 3.5
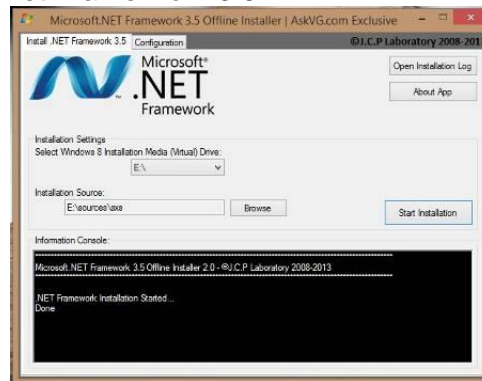
Fig. 49

f) Once the software is installed, following screen will appear:
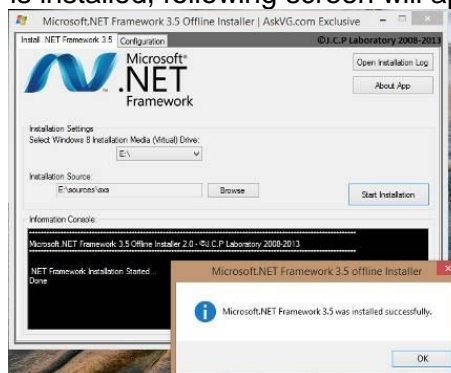
Fig. 50

g) Restart the system & proceed with aligner software installation.

For Windows10 IOT

a) Insert the Windows CD and press "**Next**" button. Select the appropriate inputs from the menu and press "**Next**" button to continue:
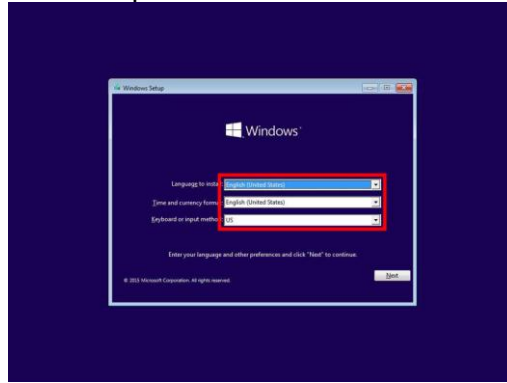
Fig. 51

b) Enter the Product key and press "**Next**" button
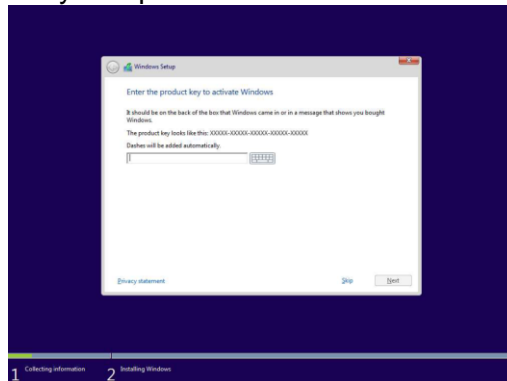
Fig. 52

Paste the Enterprise Product key in PC console & use it for activation

NOTE: PLEASE TREAT THIS PRODUCT KEY AS CONFIDENTIAL AND NOTE THAT THIS RUNTIME PRODUCT KEY WILL ACTIVATE MANY INSTANCES OF YOUR IMAGE.

c) Select "**Custom**" type for first time installation:
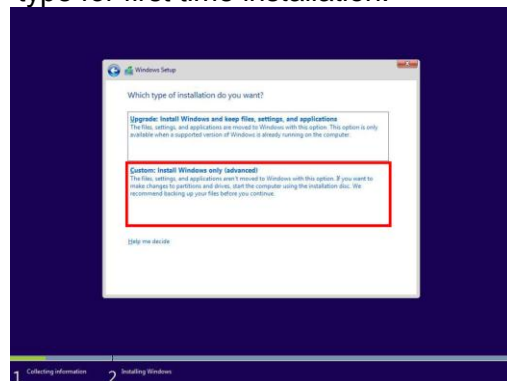
Fig. 53

NOTE: Select 'Upgrade' for maintaining existing Files, Settings & Apps

d) Choose the required disk and set the partition for installing OS and then press "**Next**" button.
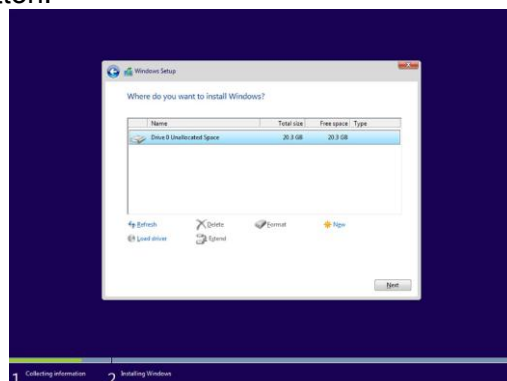
Fig. 54

e)   Press "**Use Express Settings**" after the system reboot.
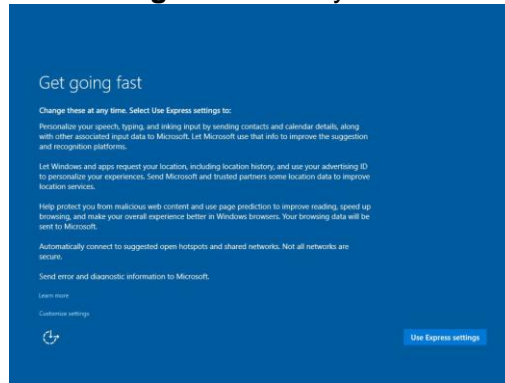
Fig. 55

f)   Enter the name of account and press "**Next**" button.
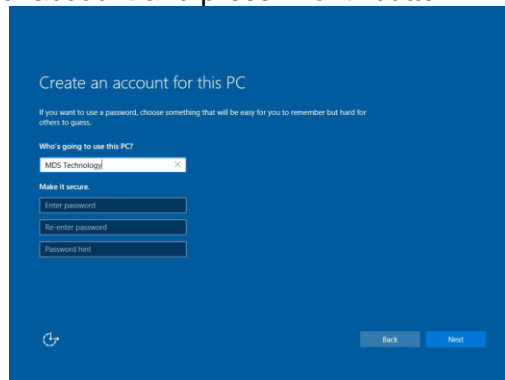
Fig. 56

g)   Windows 10 IoT Enterprise LTSB installation is completed.

Fig. 57
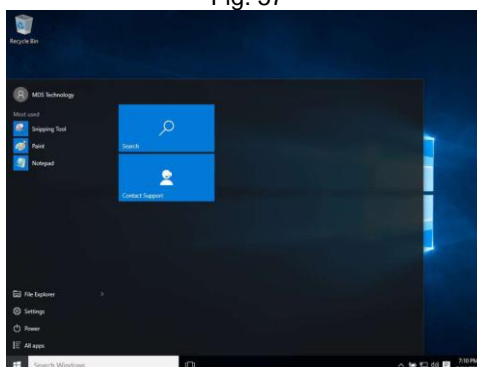
Fig. 58

h)   Ensure the Network cable is connected to access internet. Install the PC hardware drivers by downloading the required drivers from Dell Website by entering the Service Tag available for the respective PC.

i)   If Language pack is to be installed, carryout the below procedures after installing the Alignment program.

j)   Make sure that the language pack matches with your OS (32-bit or 64-bit)

k)   Select the "Language button" in Control panel and select "Add a language" as shown below:
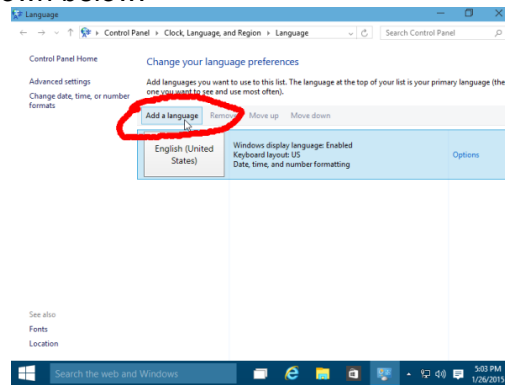
Fig. 59

l)   Select the required language and press ADD button.
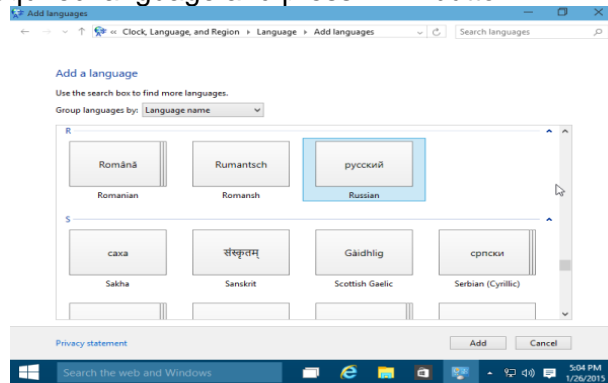
Fig. 60

m)   Click the Options link on the right side of the language just installed:
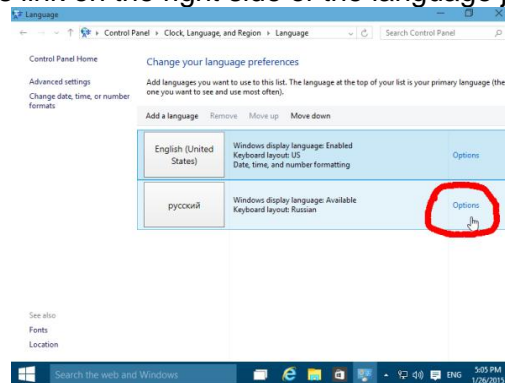
Fig. 61

n)   Click "Download and Install language pack":
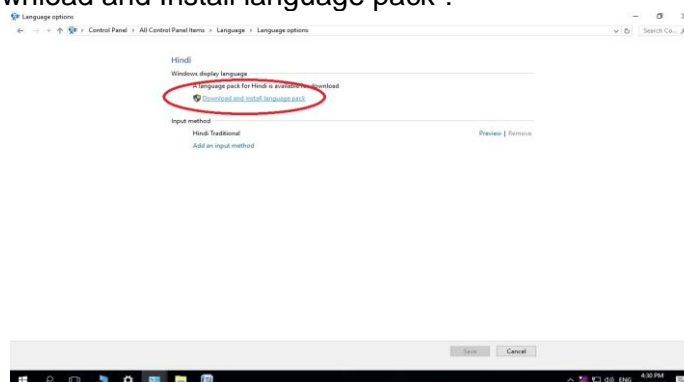
Fig. 62

o)   Once the installation is over, restart the PC.
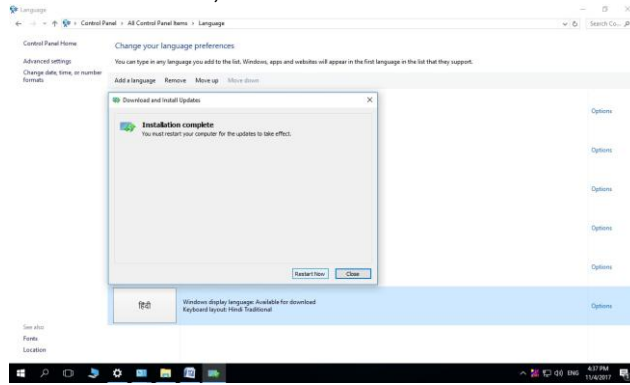
Fig. 63

p)   Go to "Language options" in the Control panel and select the preferred Language and then select "Make this the primary language" to set it as default language.
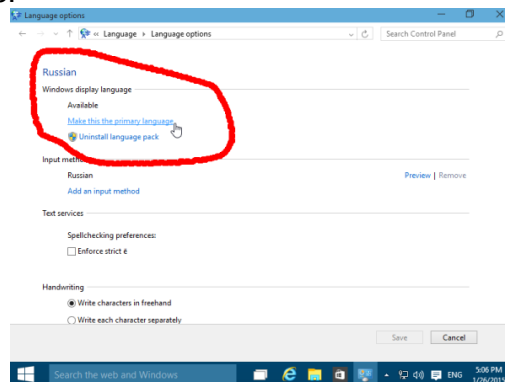
Fig. 64

q)   Install all Driver files applicable for the Mother board from Manufacturer's website/CD.

NOTE:

i.   Set screen resolution to 1280x768 by selecting "Screen resolution" in Right click option at Desktop.

ii.   DO NOT plug the USB cable from the Horizontal beam / Vertical column to the PC during OS installation.

iii.   Make sure the Printer is installed and set as default Printer.

iv.   The PC should have "d:" partition with a minimum free space of 10GB.

6.1.2.   STEP-2 : Wheel Aligner 3D Setup installation
.NET Framework installation

1.   Insert the 3D software installation CD.

2.   Copy "Install .NET Framework 3.5 via DISM.exe" and "WA32AXXX.exe" from CD to Desktop.

3.   Remove the 3D software CD from CD Drive and insert Windows10 IOT(X64) CD into Drive.

4.   Right click "Install .NET Framework 3.5 via DISM.exe" and select "Run as administrator" option to execute the program as shown below:
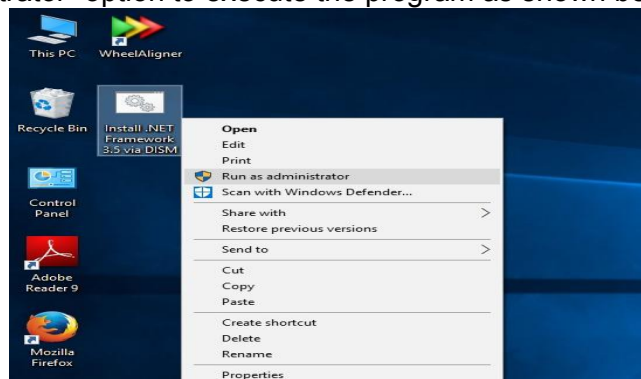
Fig. 65
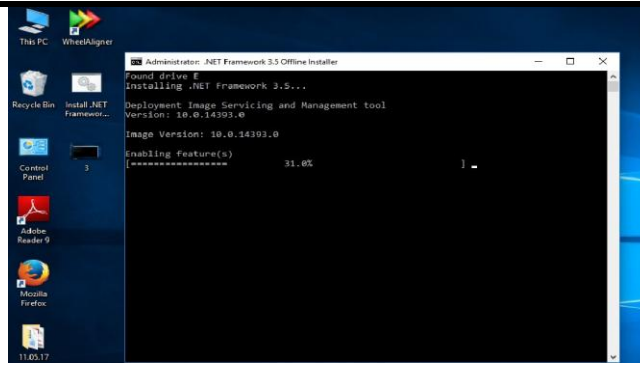
Fig. 66

5. Once the software is installed, following screen will appear:
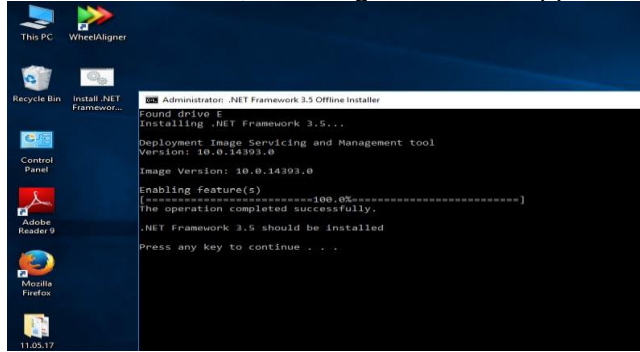
Fig. 67

6. Restart the system.

Notification Settings

1. Select *User Accounts* from *Control panel* as shown below:
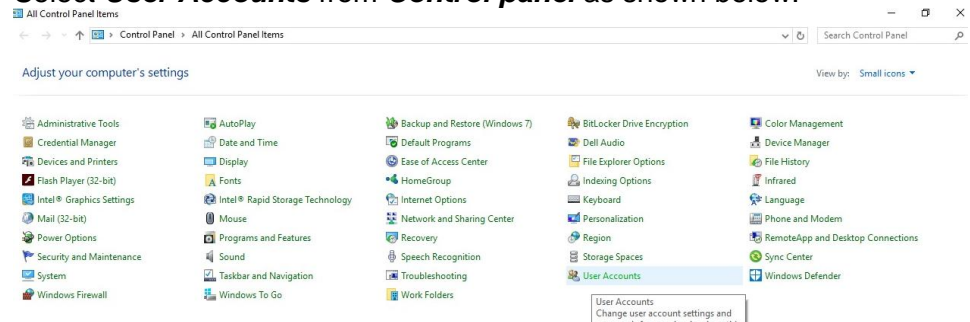
Fig. 68

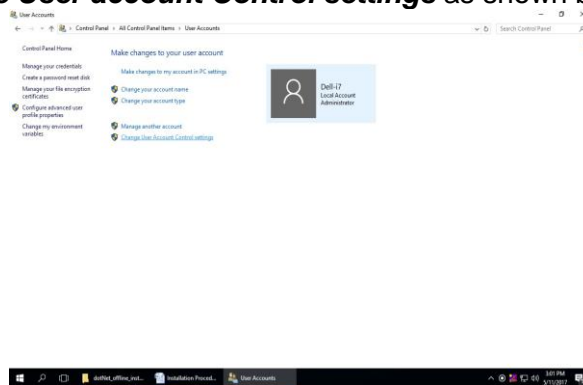2. Click *Change User account Control settings* as shown below:

Fig. 69

3. Drag the slider to down most position to set "Never Notify" and press **OK** button as shown below:
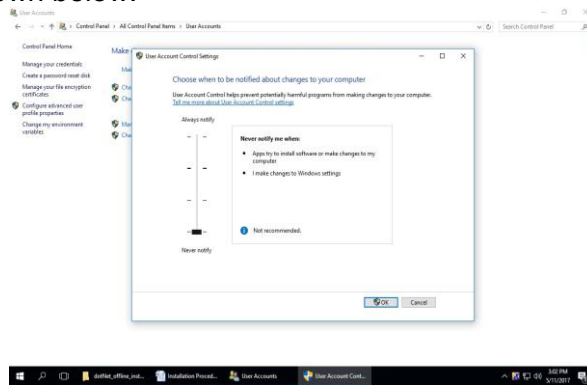

Fig. 70

Wheel Aligner 3D Setup installation

1. Double click "**WA32Axxx.exe**" file in the Software CD (last 'xxx' denotes the SW version No.). Following setup wizard screen will be displayed:

Fig. 71

2. Press "**Next**" button & follow the On-screen instructions provided to proceed further as shown below:
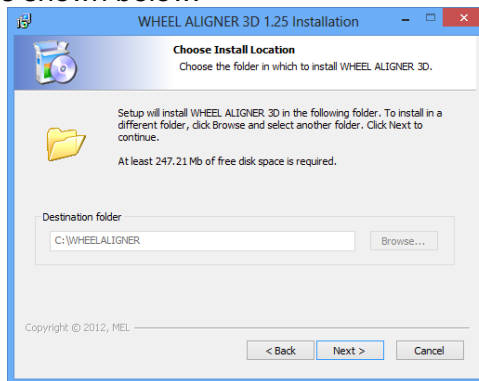
Fig. 72

3. Press "**Next**" button to proceed:
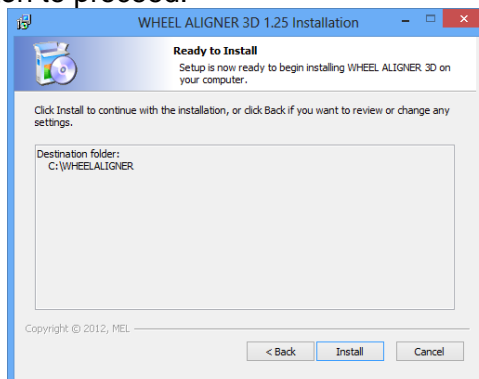
Fig. 73

4. Press "**Install**" button to proceed with installation as shown below:
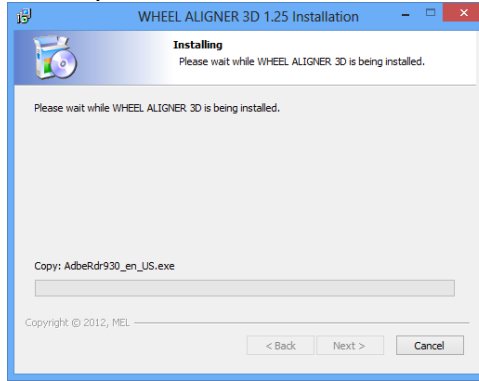
Fig. 74

5. **Adobe reader** will be installed as shown below:
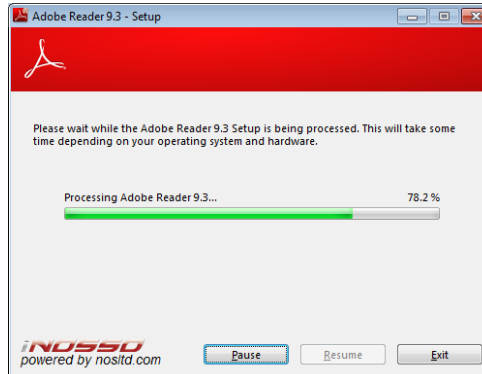
Fig. 75

6. **Crystal reports Basic Runtime** will be configured as shown below:

Fig. 76

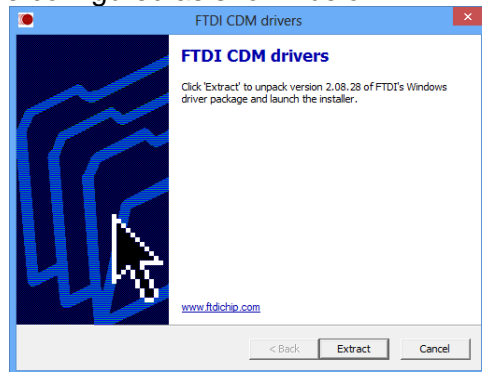7. **USB driver** will be configured as shown below.

Fig. 77

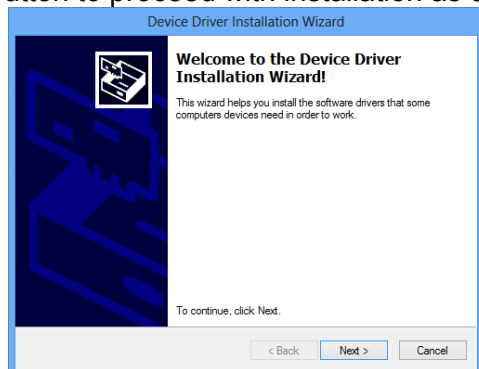8. Press "**Extract**" button to proceed with installation as shown below:

Fig. 78

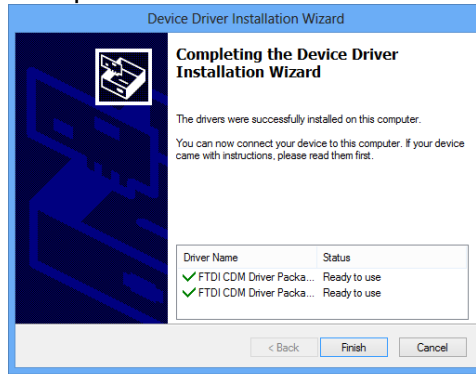9.   Press "**Next**" button to proceed with installation as shown below:

Fig. 79

Camera driver installation

1.   Press "**Next**" button and tchen follow the On-screen instructions provided to proceed with installation of Camera driver as shown below:
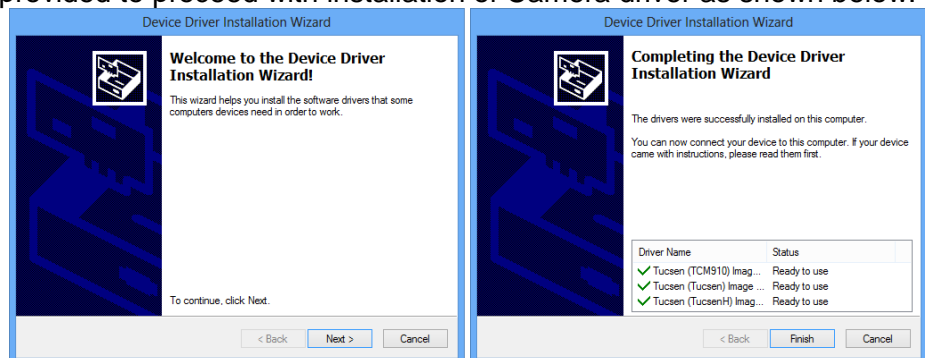

Fig. 80

2.   Following screen will be displayed to indicate the completion of Device driver installation wizard:

Fig. 81

3.   Press "**Finish**" button and system will display *installation completed* screen.

Alignment software installation

1. Press "**Next**" button and then follow the On-screen instructions provided to proceed with the Alignment software installation as shown below:
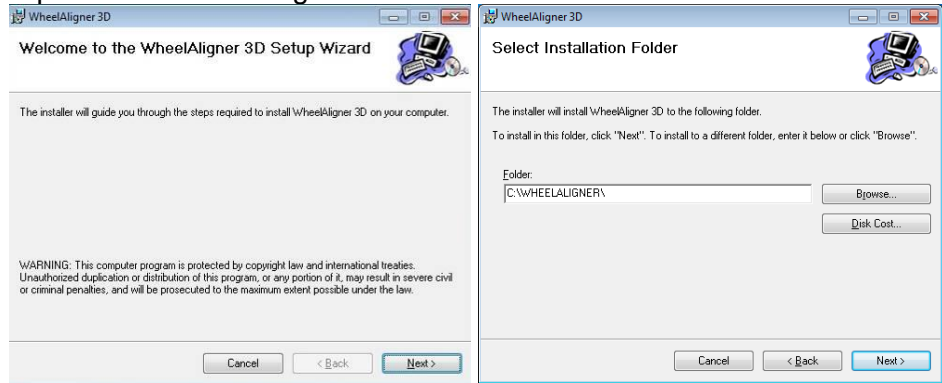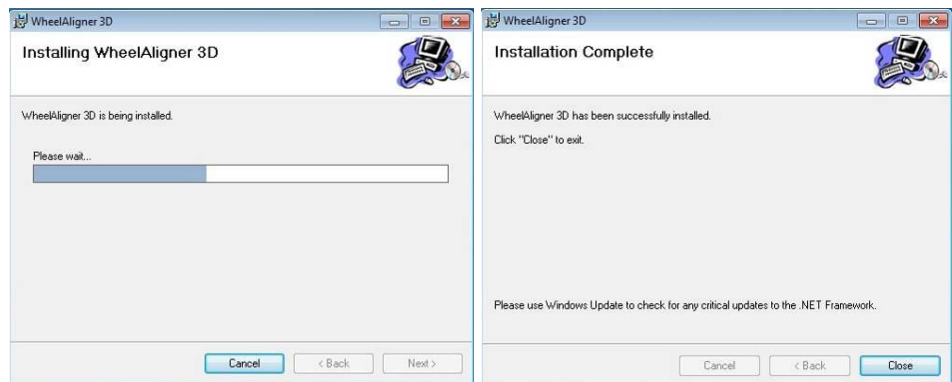

Fig. 82

Fig. 83

2. Following screen will be displayed to indicate the completion of Alignment software installation:

Fig. 84

3. Select "*Yes, restart the computer now*" and then press "**Finish**" button.
4. Plug the USB cable from Horizontal beam to the PC.
5. System will be restarted automatically and comes to desktop.
6. Run the Alignment program using shortcut in the Desktop and the following screen will be displayed:
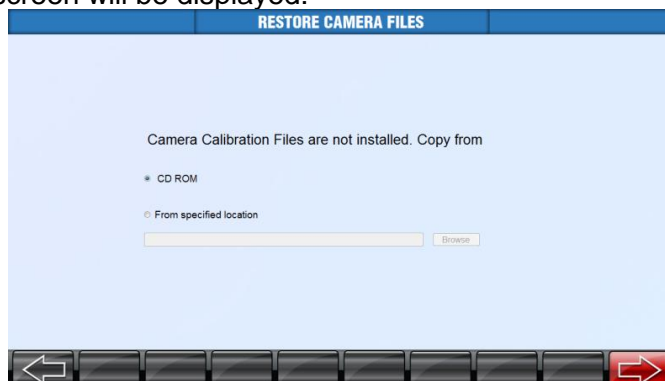

Fig. 85

7.   Usually the Camera calibration files will be available in the Installation CD. Select the CD ROM in the screen. If the user prefer to copy the calibration files from other locations, select "*From specified location*" and click **BROWSE** button to choose the source folder.

8.   Following error will be displayed if the user selects **PREVIOUS** button to skip the installation of calibration files:
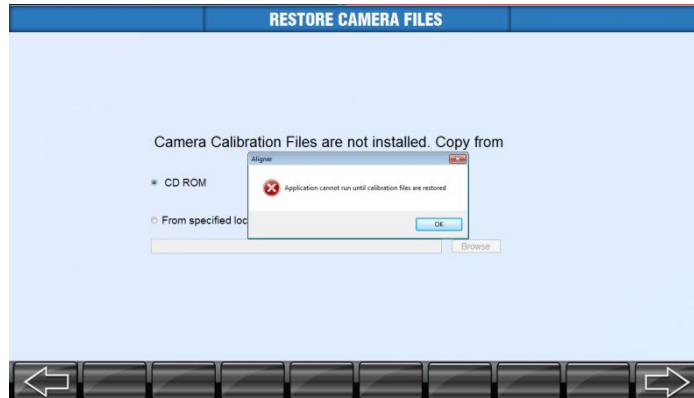

RESTORE CAMERA FILES

Camera Calibration Files are not installed. Copy from

Aligner

Application cannot run until calibration files are restored

OK

CD ROM

From specified loc

Browse

Fig. 86

6.1.3. ALIGNMENT PC SOFTWARE UPDATE

1. Shut down the alignment program from *Welcome* screen.

Fig. 87

2. System will prompt the user with following options:

Fig. 88

3. Select the "**DESKTOP**" from above option to go to Windows desktop.

4. Double click the *Software update executable file* provided by Manufacturer to update the PC software and then press "**Next**" button.

Fig. 89

5. Once the installation is completed, system will prompt to restart the computer. Select "Restart the computer now" & press "**Finish**" button.
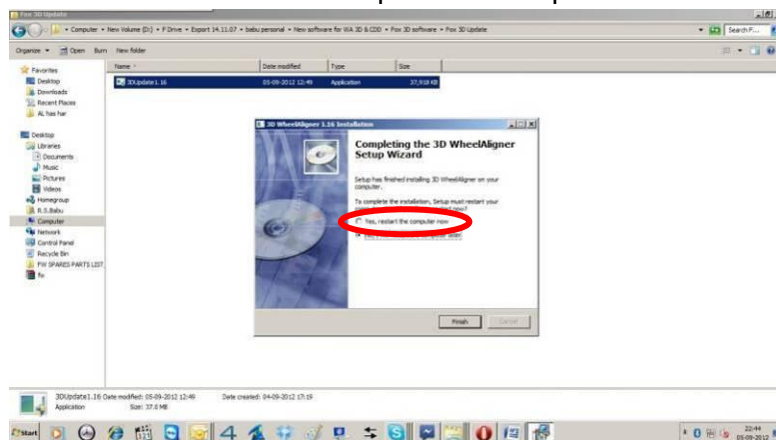

Fig. 90

6. System will re-boot and comes to Windows Desktop.

6.2. INTERNATIONAL VEHICLE DATA (Refer scope of supply)
Pre-requisites:

Before starting installation, make sure Aligner software is installed in system.

1. Double click "Autodata_XXXX_PhaseXX-3D.exe" file in the CD. Following setup wizard screen will be displayed:

Fig. 91

2. Press "**Next"** button & then follow On-screen instructions provided to proceed further as below:
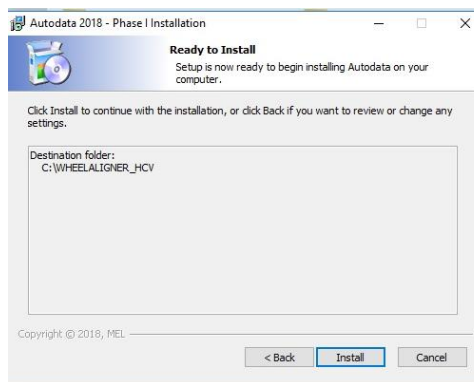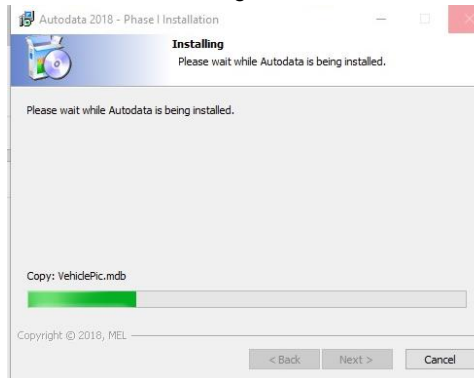

Fig. 92

Fig. 93

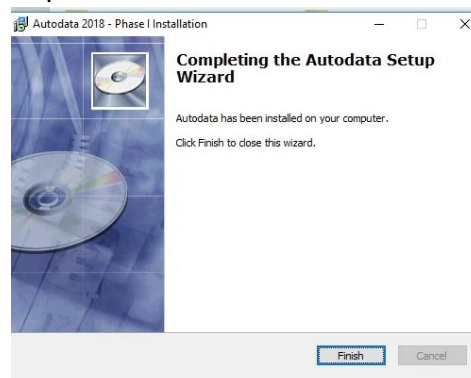3. Press "**Finish"** to complete the installation.

Fig. 94

4. Activate the Vehicle data as explained in Chapter 7.7.10.1 (*Lock details*).

7. CALIBRATION

☞	**This feature is protected with service password and should be used only by authorised Service personnel**
☞	**Calibration is a very important function. During this process, the Calibration kit should not be jerked or moved**
☞	**Even though the system is perfectly calibrated at Factory, it can be ensured by calibrating the system again at customer premises before commissioning**
☞	**Ensure Sunlight / external light source does not fall directly on the Target plate during Calibration / Alignment, which may affect the accuracy of readings**
☞	**In AVH model, Horizontal beam should be rested at home position during Calibration**

If the alignment readings obtained for all vehicles are error prone, then it is advisable to check calibration. Calibration is to check the raw data transmitted by sensing devices. The procedure for checking the calibration is as follows. Following options are available in **Calibration** once selected from *Settings* screen:
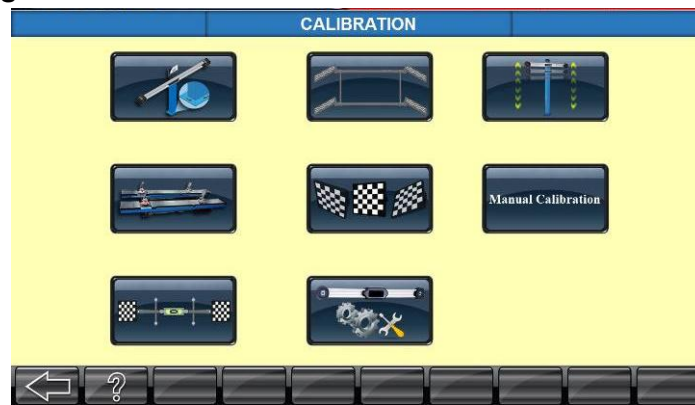
Fig. 95

7.1. BEAM INSTALLATION

This featured is used to avoid field calibration at the time of installation. 3D Aligner is perfectly calibrated in the factory using high precision calibration setup & highly trained personnel. However to ensure the same accuracy during installation, a Dual axis sensor is used in the horizontal beam. After mounting the Horizontal beam on the Vertical column, select the **INSTALLATION** from *Calibration* menu & try to achieve Green color values for both Z axis (Vertical column) and Y Axis (Horizontal beam) by leveling the vertical column using shims.

Fig. 96

7.2. FLOOR CALIBRATION

☞ **In case of Lift, rest the platform at home position to carryout Floor calibration**

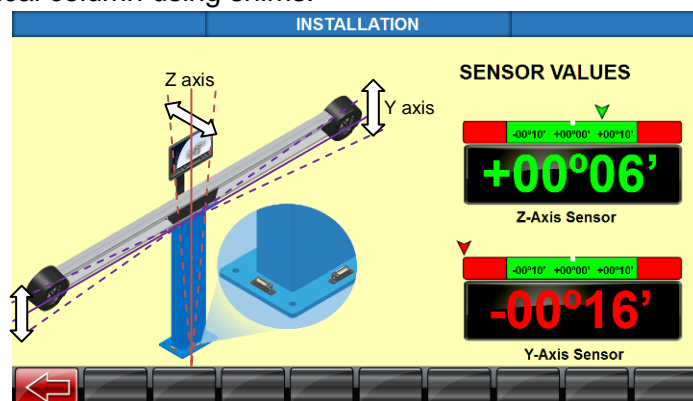This feature is used to compensate uneven level on the Pit/Lift. Select **FLOOR CALIBRATION** from *Calibration* menu. Two status buttons are provided to Enable / Disable this feature, which will be indicated with ☑ mark / ☒ mark respectively. Fix the Target plates with Wheel bracket.

Place both the Front target plates over the respective Rotary plate center by resting the Wheel bracket Rim locking pins over the surface as shown below & similarly place the Rear target plates 2mtr away from Front target plates as shown in screen.
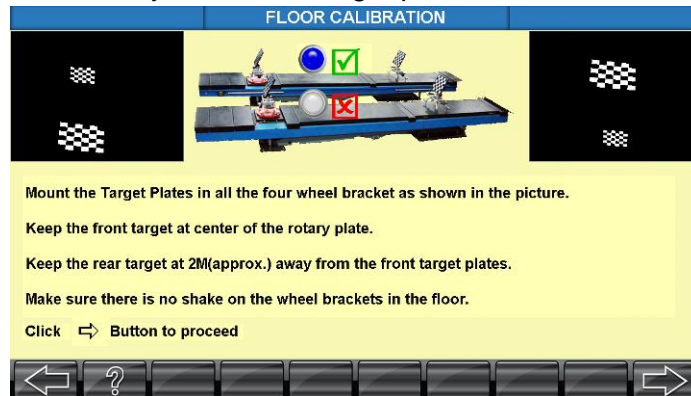
Fig. 97

Press **NEXT SCREEN** button to proceed further.

Try to make Front Left and Right distance equal. Same way make both Rear Left & Right distances equal. Once the distances are made equal, **SAVE** button appears. Press **SAVE** button.
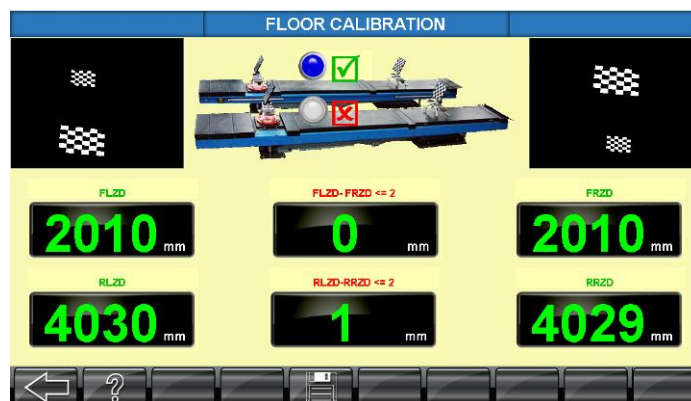
Fig. 98

7.3. SENSOR (DUAL AXIS) CALIBRATION

Use the Dual axis Sensor calibration kit to calibrate the sensor. Fix the entire PCB assembly along with the plate as shown below (USB hub PCB + Sensor) on the calibration Jig. Level the base plate in both X & Y direction using the jack screws provided in the Base plate. Ensure the bubble level is at center of the two lines and without any tilt in the base.

Connect the Sensor connectors CN4 (Y axis) & CN5 (Dual sensor output X axis is labeled as Z axis) as shown below:
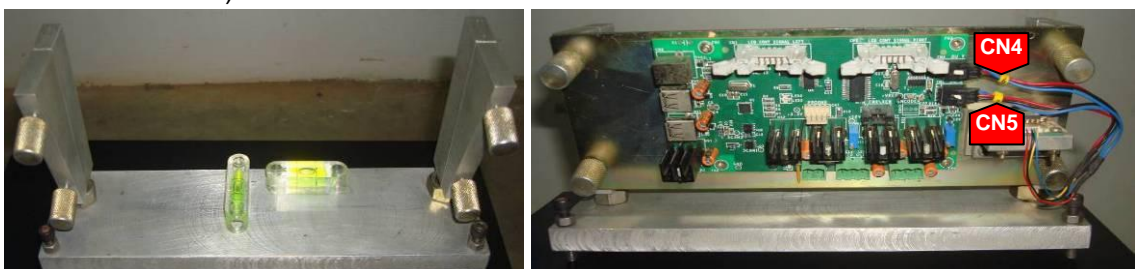
Fig. 99

Connect the power cable and USB cable alone to the board. No need to connect camera cables at this stage.

Fig. 100

Run the 3D alignment software. It will run in Demo mode only. Select **SENSOR CALIBRATION** from *Calibration* menu. The following screen will appear:
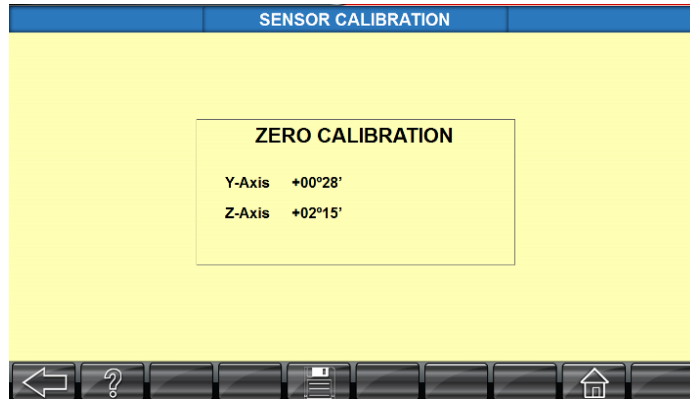
Fig. 101

Press **SAVE** button to save the zero offset values of the Dual axis sensor.

Fix the 6° block (Big) on the Jig as shown below and save Y Axis Span calibration.
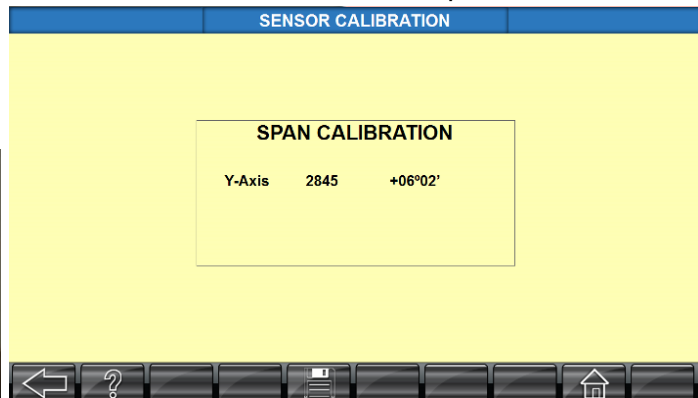
Fig. 102

Remove the 6° block (Big) and Fix the 6° block (Small) on the Jig shown below and save Z Axis Span calibration.
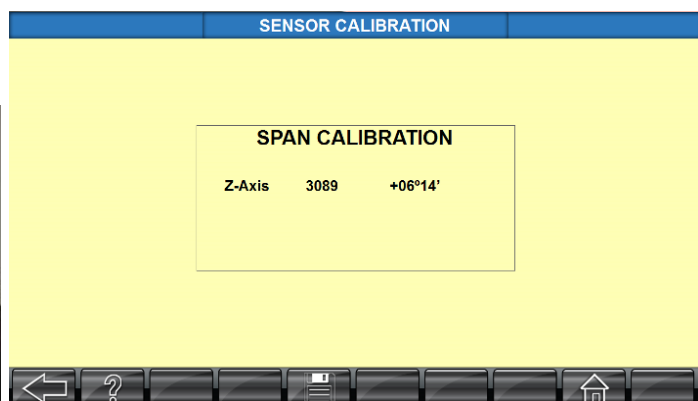
Fig. 103

7.4.   CAMERA CALIBRATION

7.4.1.   FOUR SHAFT CALIBRATION

1.   Place both the Connecting tubes on the floor as shown below:
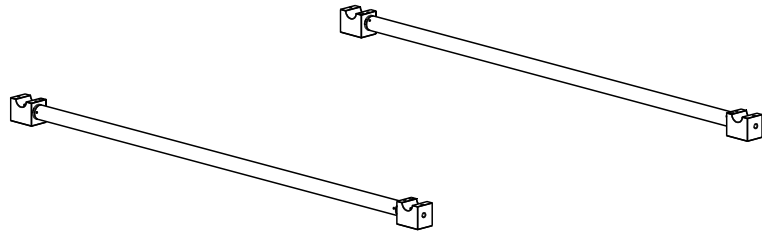
Fig. 104

2.   Locate each of the Calibration shaft with the Connecting tube end blocks properly as shown below:
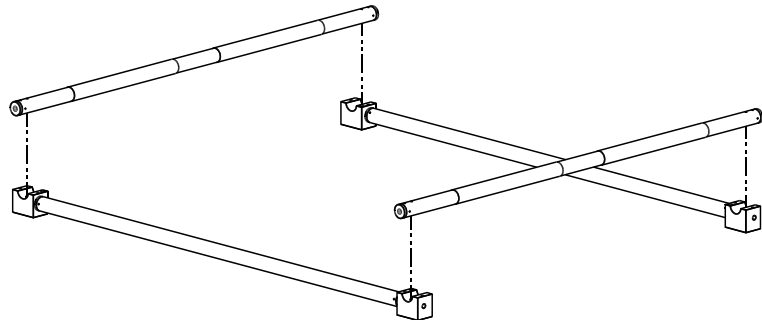
Fig. 105

3.   Lock the Calibration shaft with the Connecting tube end blocks using 'C' clamp and fasten it using M8x25mm Allen screw as shown below:
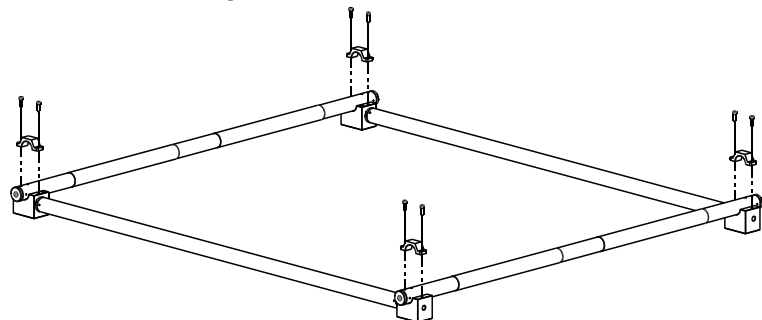
Fig. 106

4.   Fasten the Vertical stems with Connecting tube end blocks as shown below:
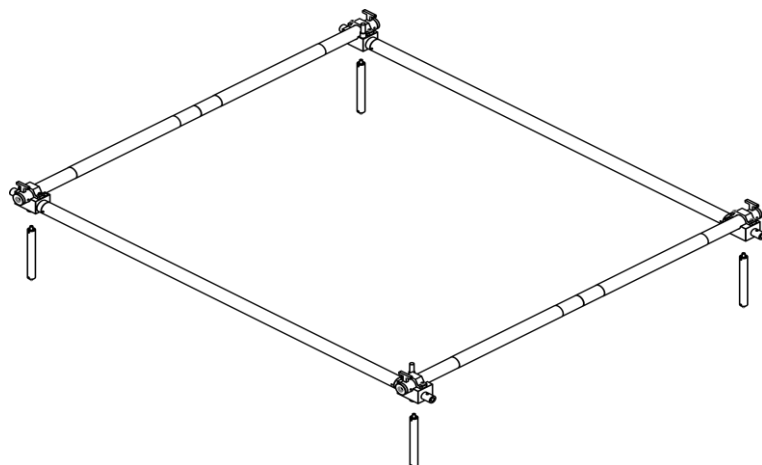
Fig. 107

5.   Ensure the Calibration shaft centre height from the floor is 330mm

6. Insert the Cross pipe (with middle bush) into the hollow end of another Cross pipe and lock the assembly using Dowel pin as shown below:
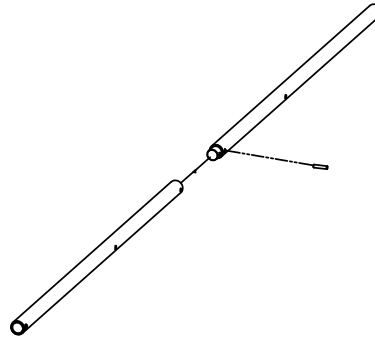
Fig. 108

7. Locate the Stepped pins into the front & rear side LH shaft mounting blocks (ie., diagonally) as shown below and then locate the Cross pipe assembly with the diagonally placed Stepped pins:
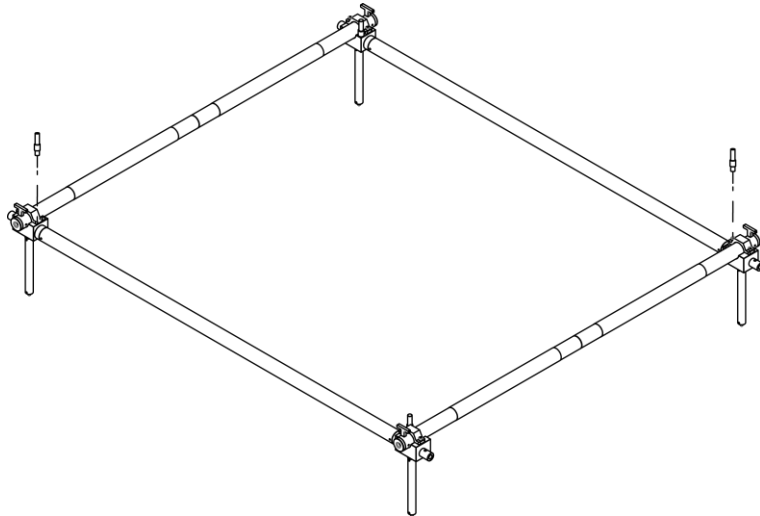
Fig. 109
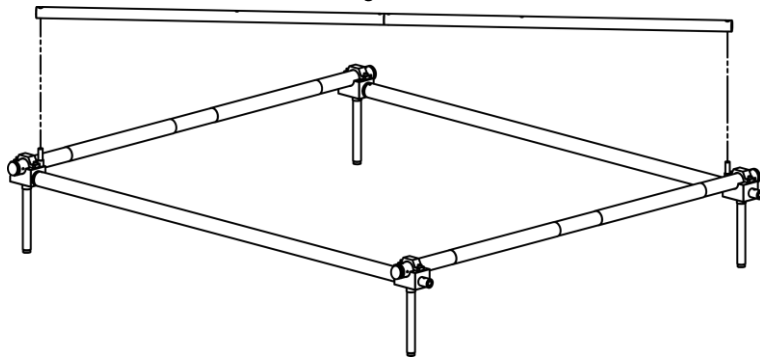
Fig. 110
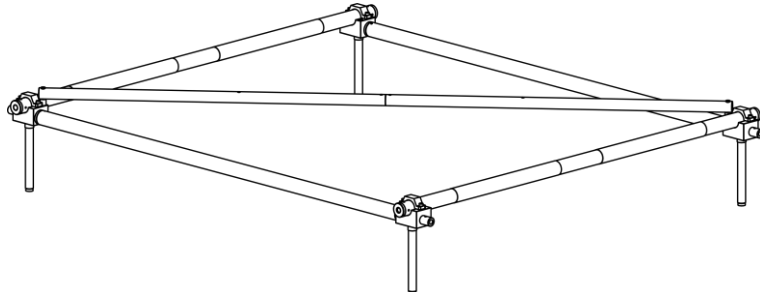
Fig. 111

8. Use Arm locking knob to lock the Target plates during calibration.
9. Ensure the height of Calibration shaft at all the corners are maintained evenly before proceeding with calibration.

10. Place the Four shaft calibration kit over Rotary plate by positioning the front stand over it exactly at the centre of Alignment Pit/Lift (~1125 - 1150mm from the camera). Fix one pendulum in mid of front shaft and another pendulum in mid of rear shaft. Make equal distance of pendulum line by positioning the Calibration kit in such a way that front pendulum & rear pendulum are at equal distances from the side walls of lift platform. Mount all the Target plates to its respective location in Calibration kit.

PT model

860

860

2800mm
*

2800mm
*

* - 2000mm for Smart models

Fig. 112

VH / AVH model

860

860

2800mm
*

2800mm
*

* - 2000mm for Smart models
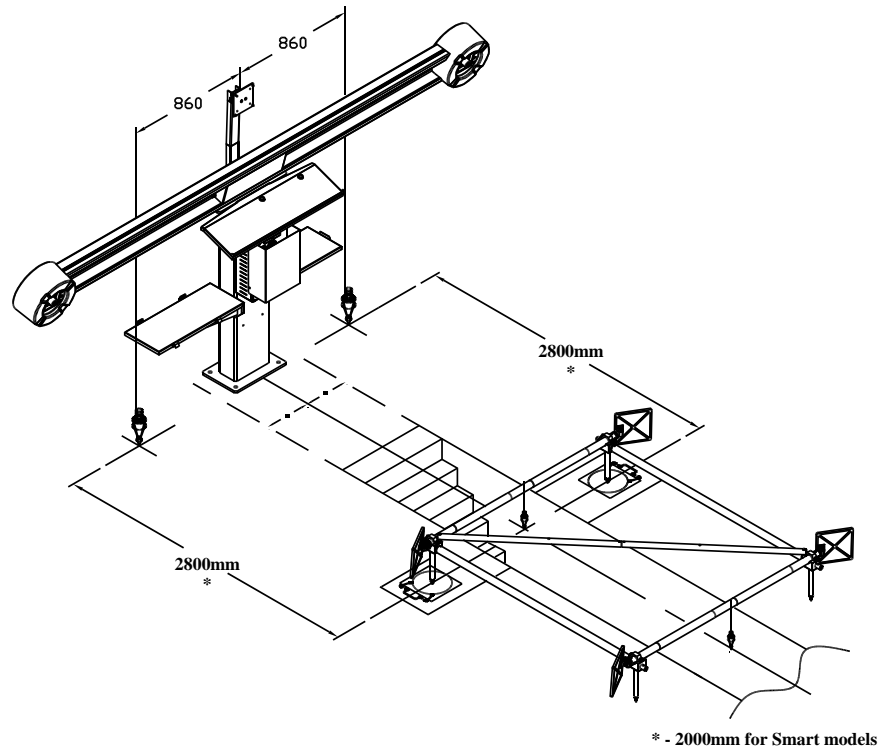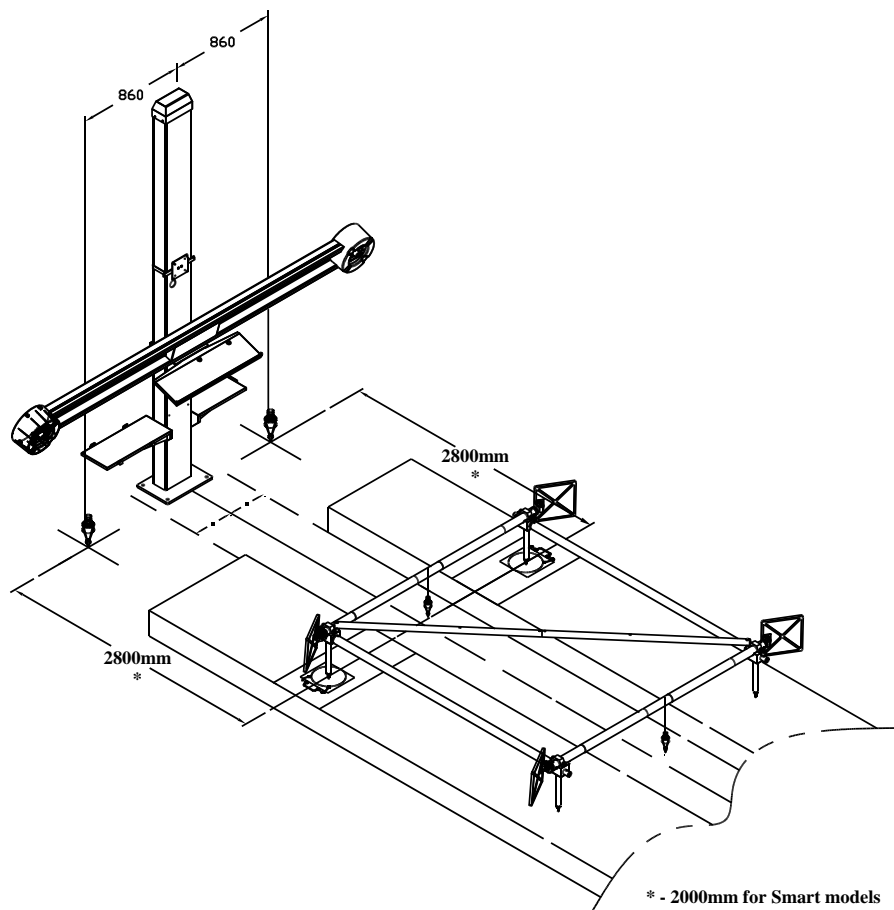
Fig. 113

In-Lift model
For Right hand steering drive vehicles
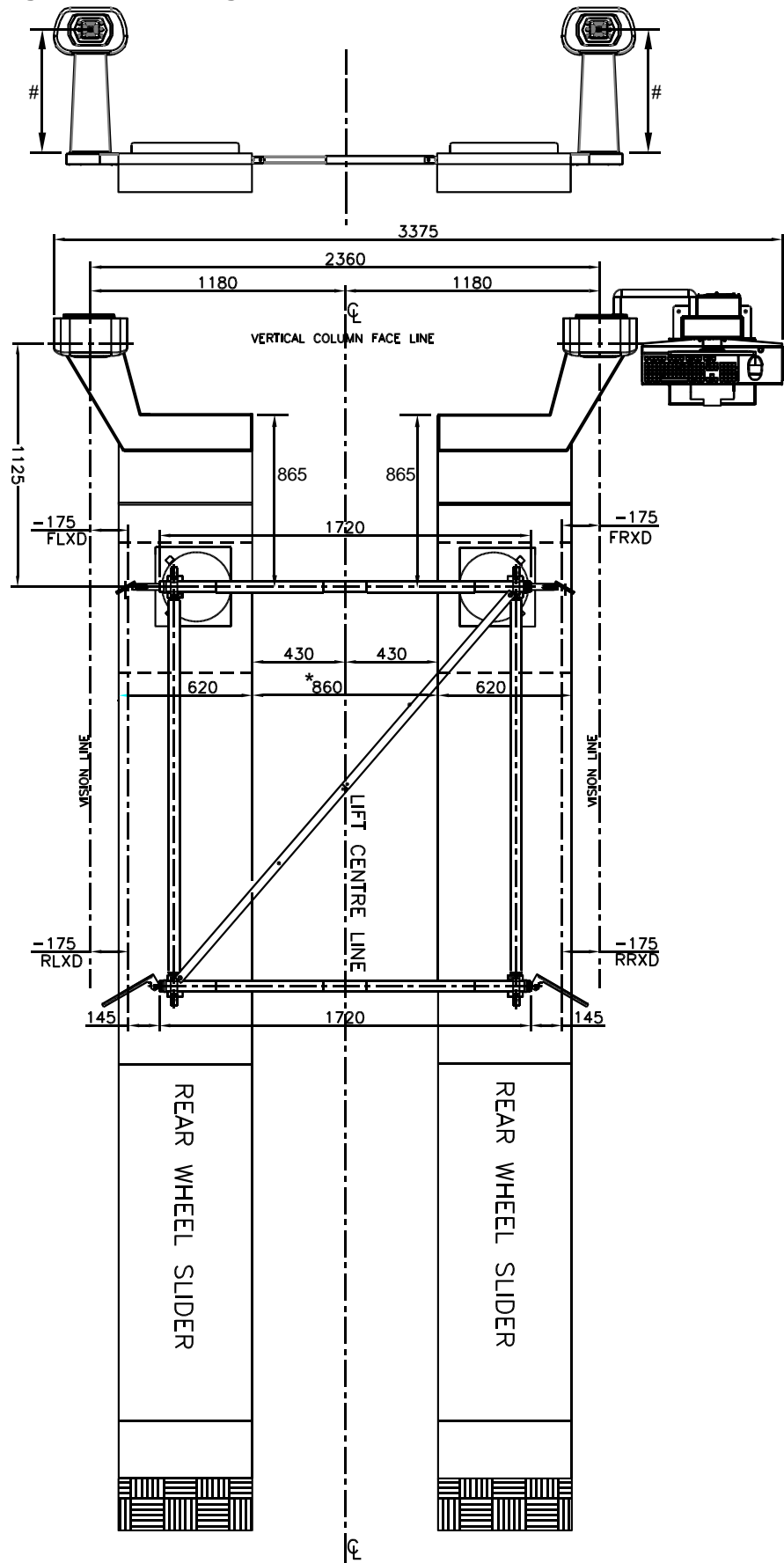
Fig. 114

NOTE: *   - Gap between the two platforms of Scissor lift should be 860 / 886
±2mm (Depending upon the Lift models)

   # - Indicated dimensions should be made equal (Tol.: ±5mm) using
Water tube level

For Left hand steering drive vehicles
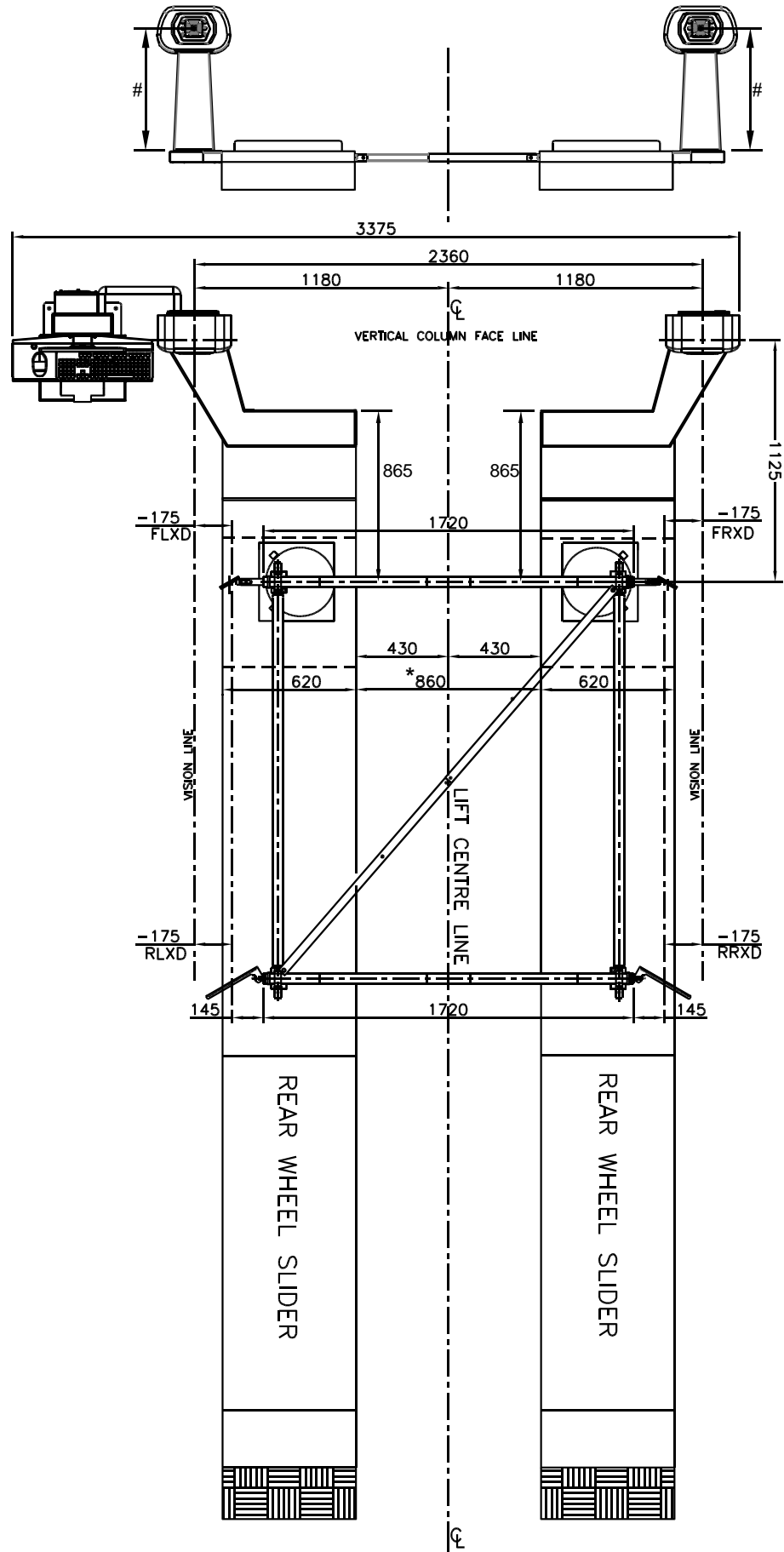
Fig. 115

NOTE: * - Gap between the two platforms of Scissor lift should be 860 / 886 ±2mm (Depending upon the Lift models)

    # - Indicated dimensions should be made equal (Tol.: ±5mm) using Water tube level

	DO NOT interchange the Front & Rear Target plates (refer the Identification sticker pasted at the back side of Target plates)
	In case of VH model, raise the Lift platform to required height by ensuring the Target plate images are visible in the screen
	For AVH model, during Calibration, rest both the Horizontal beam and Lift platform at home position

Select the **FOUR SHAFT CALIBRATION** Icon from **Calibration** options in *Settings* screen. System will prompt for password. Key-in "FSCMEL" as password. Following *Attention* screen will be displayed:
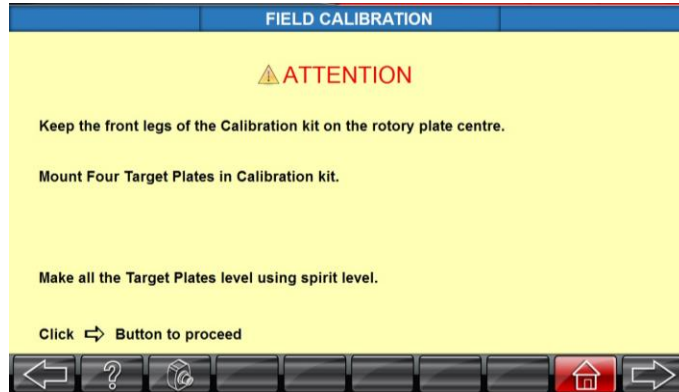
Fig. 116

Comply with on-screen instruction & press **NEXT SCREEN** button to proceed.

The Machine will search for the target plates and then displays a **STOP** indication as shown below:
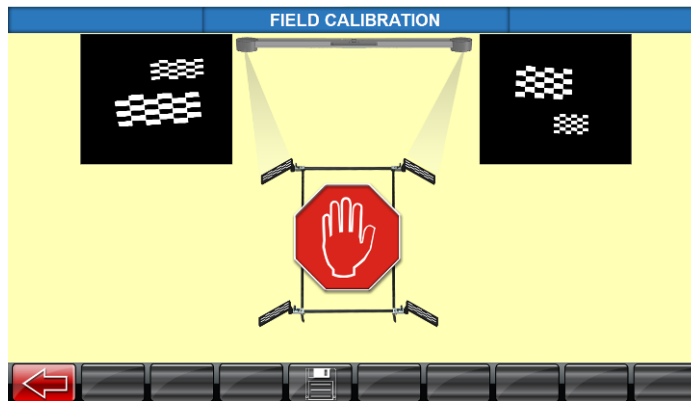
Fig. 117

	DO NOT disturb/move the Calibration kit while identifying the Target plates

Set the verticality of the Camera columns by matching the field VVA with Factory VVA using Allen screw provided in the vertical column depending on the direction of the tilt requirement. The VVA angle will ensure the verticality of the column in front position. For side position, use Spirit level in the bottom frame and use suitable thickness of shims to fill the gap between the Vertical column bottom frames & Adjustable Master base plate.

Follow the On-screen instructions (arrow indications) to achieve the below tabulated conditions. Otherwise the SAVE button will not appear:

For Drive Through model
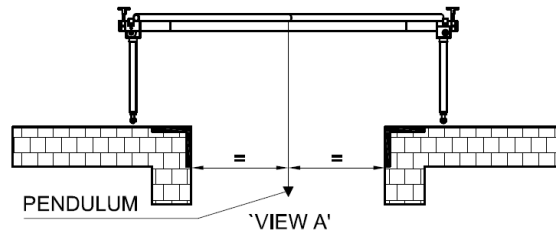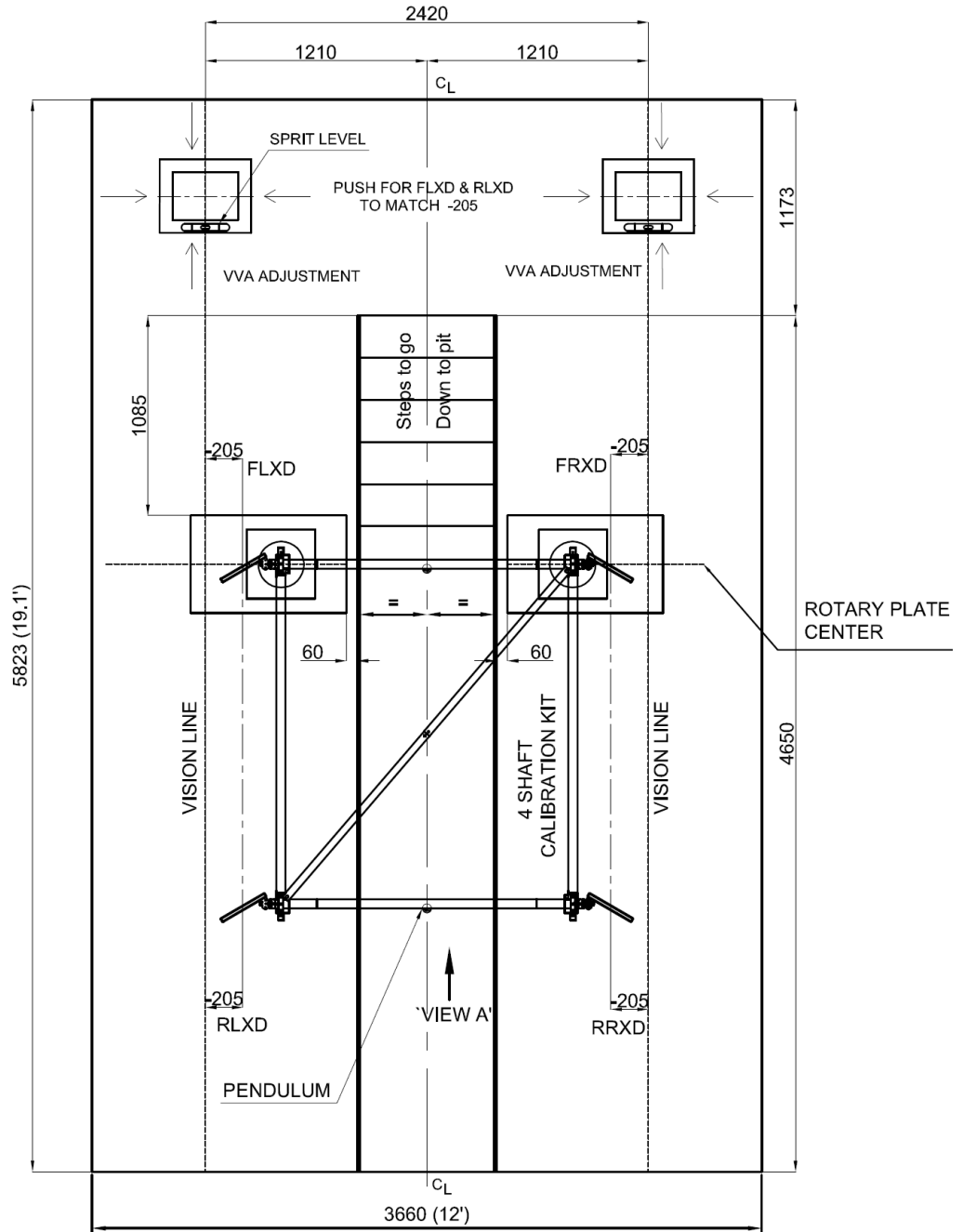
Fig. 118

NOTE:
1. U.O.S. ALL DIMENSIONS ARE IN mm.
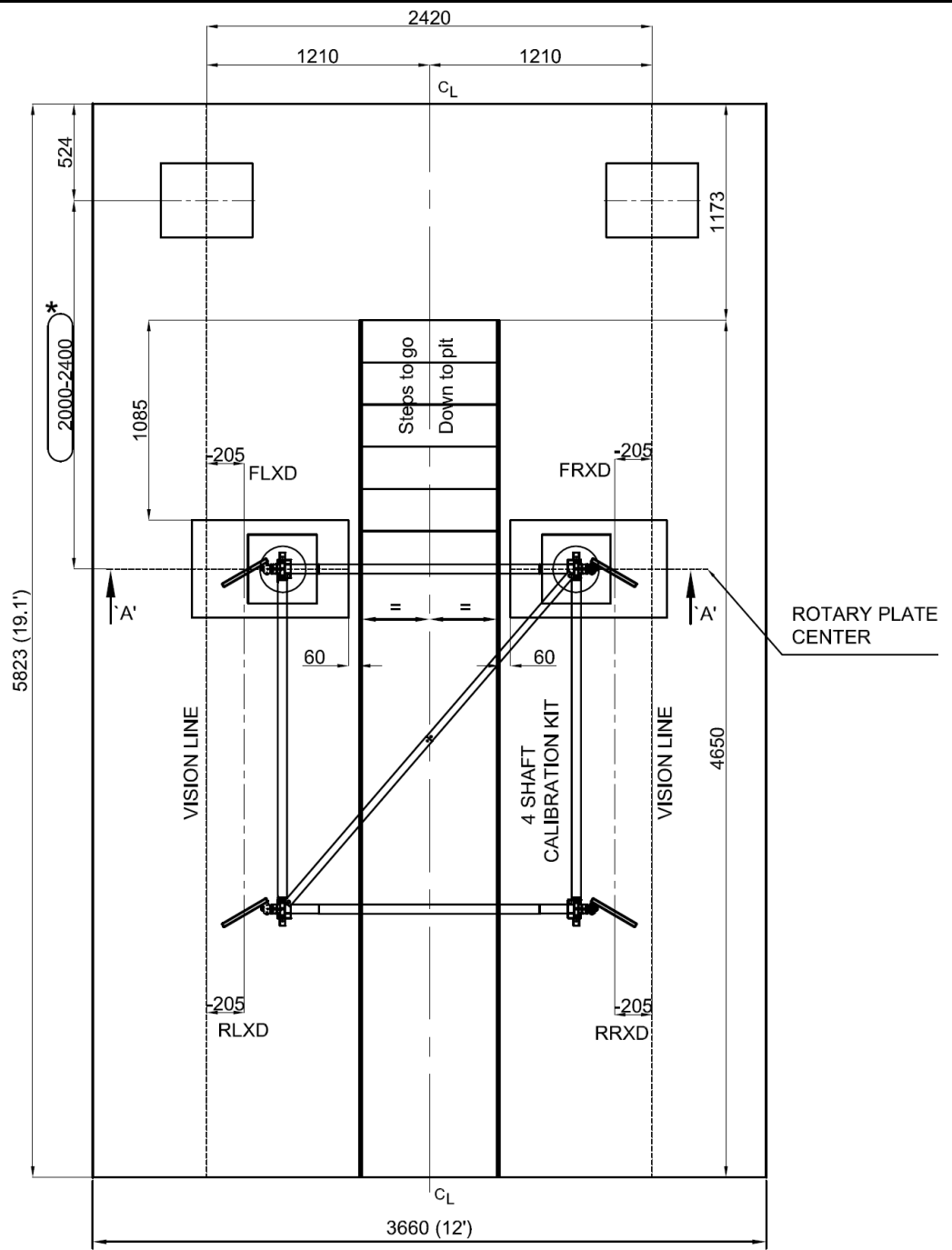
Fig. 119

For In-Lift model
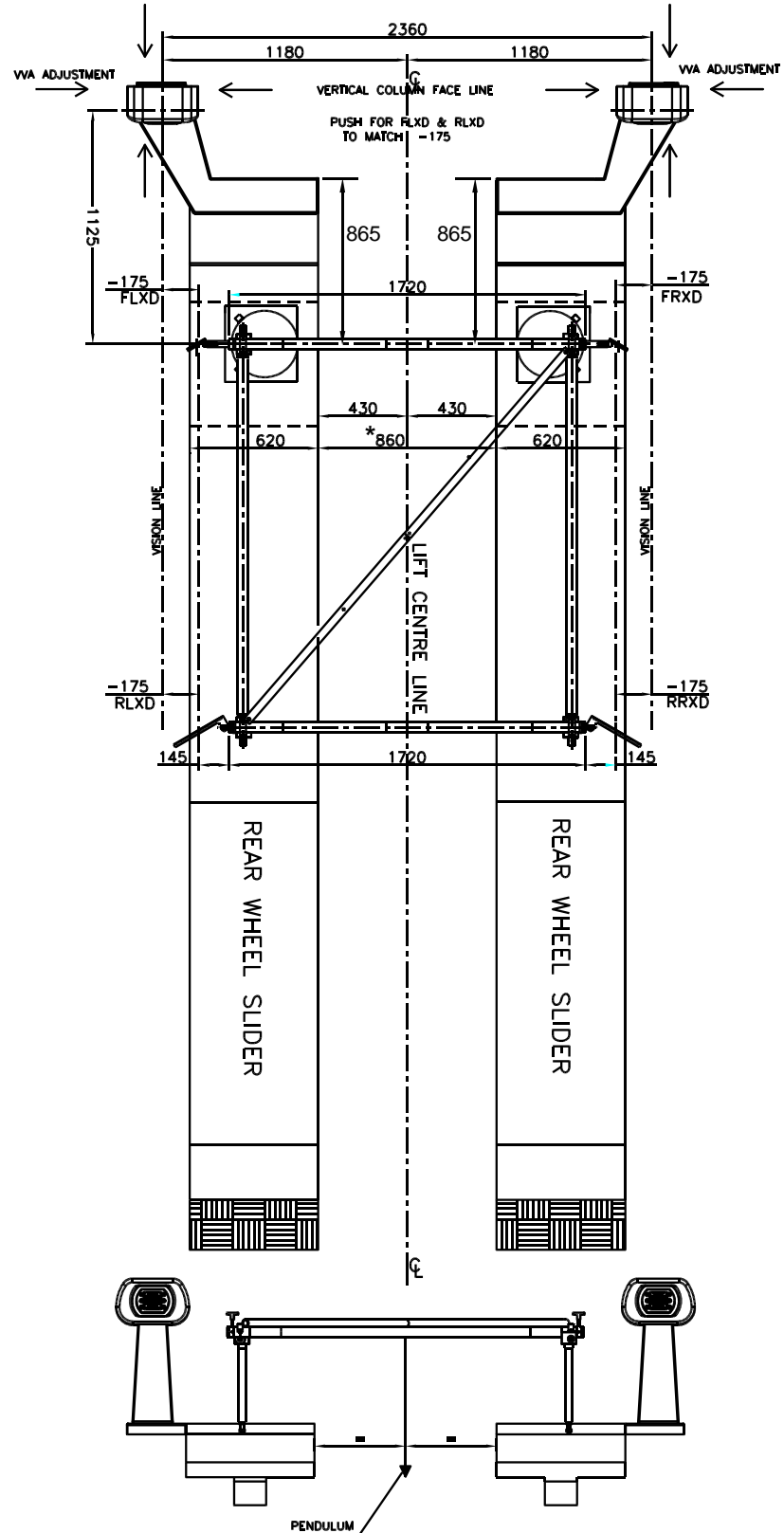
Fig. 120

Move the Camera columns in backward or forward direction till the respective left & right side Vertical columns are made equal physically(1125mm) as shown above.

Same way, turn the Camera columns towards left or right directions to make

FLXD equal to RLXD (-175mm) – For left side Vertical column

FRXD equal to RRXD (-175mm) – For right side Vertical column

Turn the left Camera column towards left side if XD reading is <-175mm and right side if XD is >-175mm and vice versa for right side Camera column ie., tilt the column right side if XD is <-175mm and left side if XD is >-175mm. The acceptable limit for the XD difference is 10mm for frond XD to rear XD.

For Drive Through model

Fig. 121

For In-Lift model

2360

1180 | 1180

VERTICAL COLUMN FACE LINE

TURN FOR FLXD
ADJUSTMENT

TURN FOR RLXD
ADJUSTMENT

1125

865 | 865

−175
FLXD

1720

−175
FRXD

VISION LINE

430 | 430

620 | *860 | 620

LIFT CENTRE LINE

VISION LINE

−175
RLXD

−175
RRXD

145

1720

145

REAR WHEEL SLIDER

REAR WHEEL SLIDER
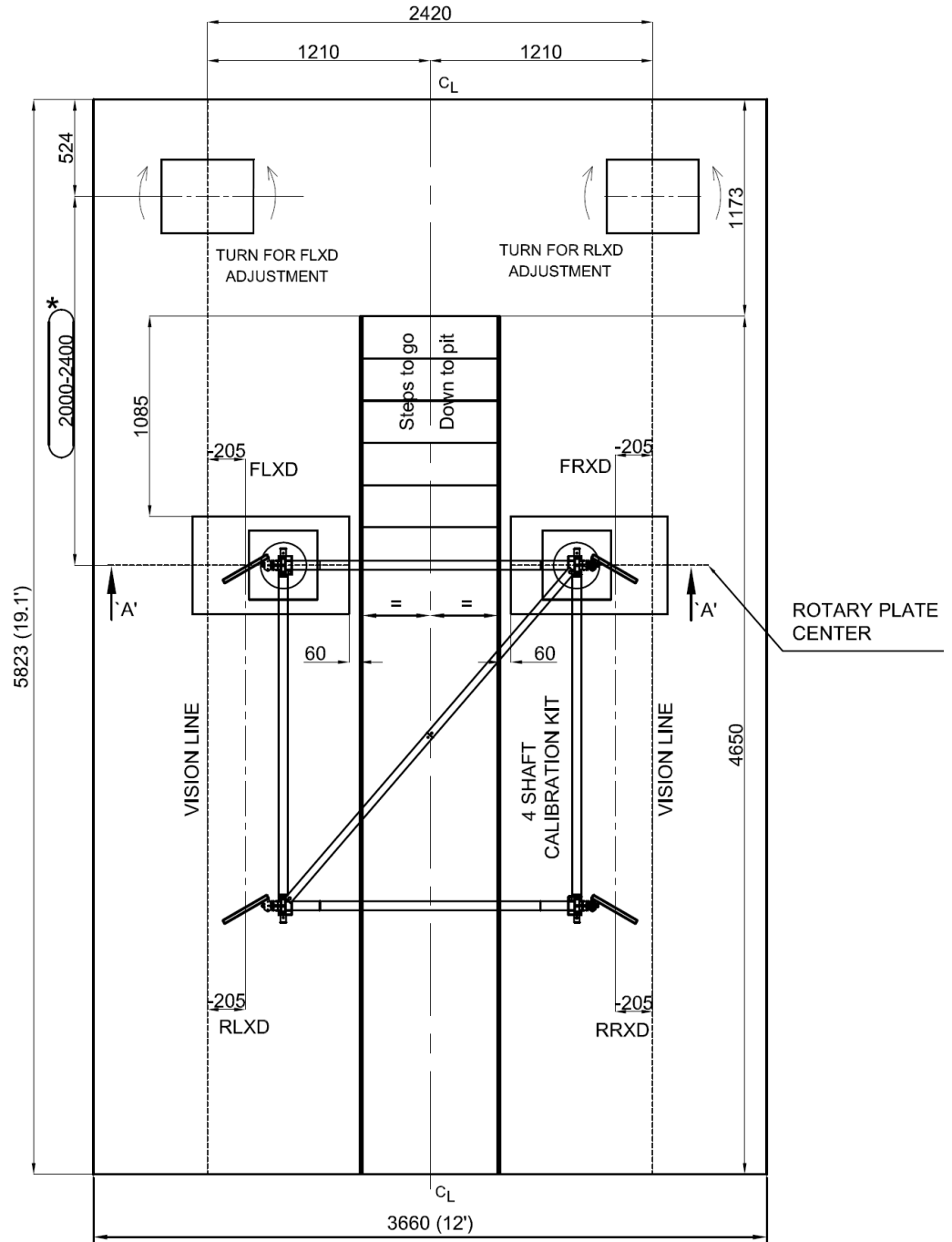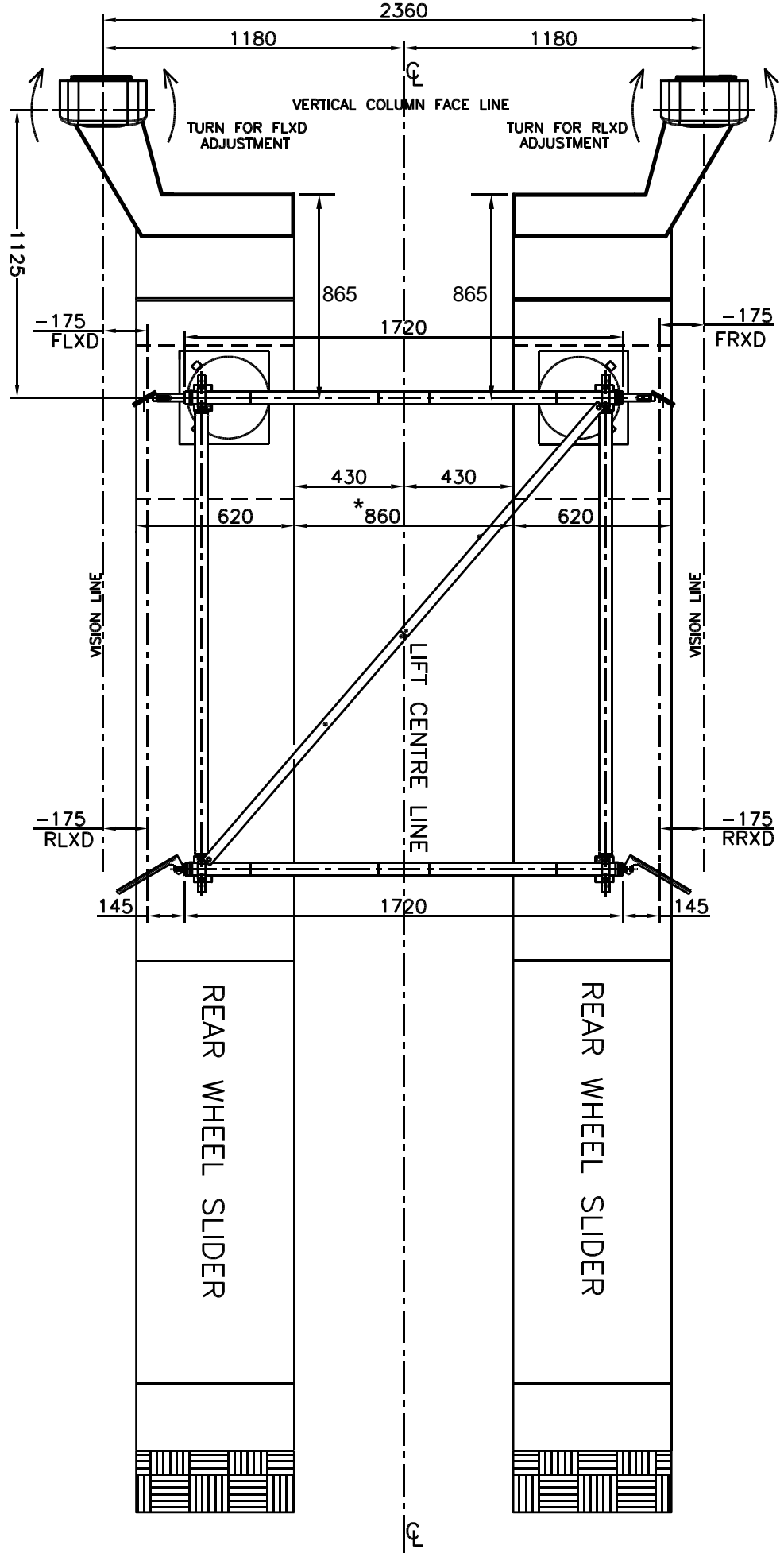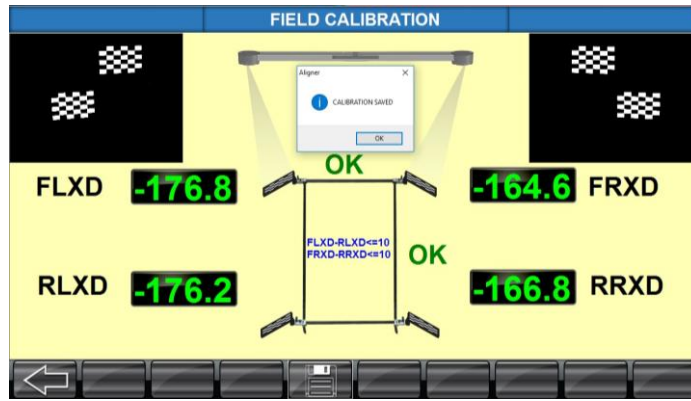
Fig. 122

Fig. 123

	PT / VH / AVH / DT	In-Lift
FLXD	-205mm	-175mm
FRXD	-205mm	-175mm
RLXD	-205mm	-175mm
RRXD	-205mm	-175mm

👉 **To view the factory set Camera Vertical Vision Angles (VVA), field set VVA and Live VVA, press CTRL+F9 keys**

Ensure the XD settings are equal for FL & RL, FR & RR by adjusting the Vertical column.

Set both Left & Right VVA angle as per Factory setting (Tol.: ±0.2°).

"*Calibration saved*" message will be displayed. Press **OK** button and following screen will be displayed to feed the Service personnel name, which will be printed in the Calibration certificate.
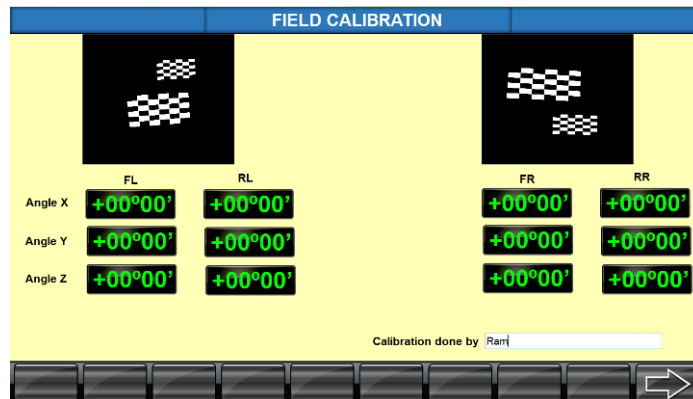
Fig. 124

Press **NEXT SCREEN** button to exit from *Four shaft calibration*.

7.4.2. SINGLE SHAFT CALIBRATION (Applicable for the Ver.3.06 & below only)

☞ **Single shaft calibration kit will not be compatible for In-Lift model**

Mount the Calibration Shaft with Calibration kit stands at both ends. Ensure the horizontality of shaft using Spirit level by adjusting Jack screws provided in the Stands and then lock the position using Lock nuts. Finally lock the Shaft with Stands firmly using M8x25 Allen screws to avoid rotation as shown below:
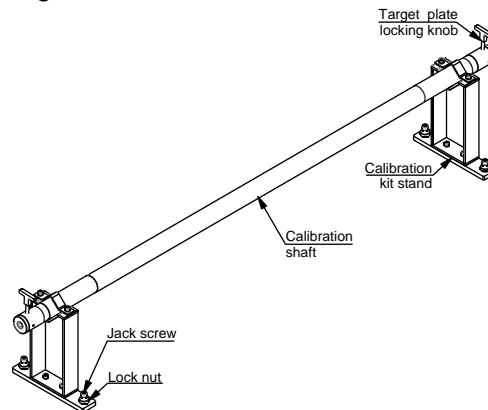
Fig. 125

Cover both the ends of Calibration shaft using End cap.

☞ **In case of VH model, raise the Lift platform to required height by ensuring the Target plate images are visible in the screen**

☞ **For AVH model, during Calibration, rest both the Horizontal beam and Lift platform at home position**

Select the **SINGLE SHAFT CALIBRATION** Icon from **Calibration** options in *Settings* screen.

Following screen will be displayed. Follow the On-screen instructions:
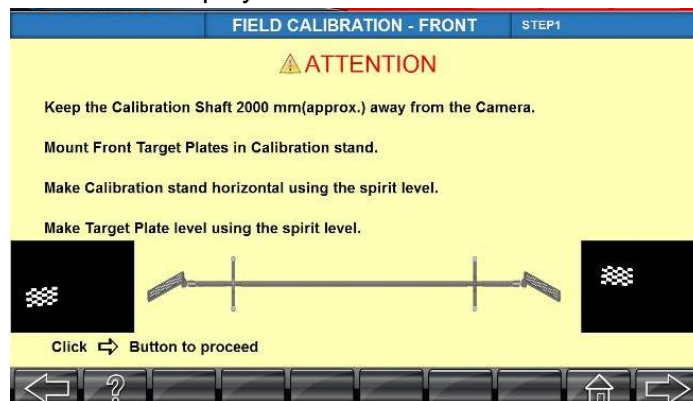
Fig. 126

Place the calibration kit on the Rotary plates (turn tables) at a distance of 2mtr as shown in the screen and level the shaft using Spirit level. Mount the Front target plates in the respective locations (i.e. Left Target plate on Left side and Right Target plate on Right side of the Calibration kit) and level them. Press **NEXT SCREEN** button to go to Target plate identification screen.

Fig. 127

Once the images of the Target plates are identified, the following screens will displayed:

Fig. 128

Move the Calibration stand forward or backward as guided (arrow blinking) by the system on the screen to get equal distance between the Camera to the Front Target plates for Left & Right side (FLZD =FRZD). Once the distance is achieved, move the Calibration stand in horizontal direction, either Left of Right side as guided (arrow blinking) by the system on the screen. The readings will become green after achieving the all the readings are within ±1mm. Try to achieve the difference values zero for the Distance (ZD) and Horizontal (XD) values for better accuracy. Ensure the spirit level again.

Click **SAVE** button to save the Front distance values. After saving the distance values, the following screen will be appear:
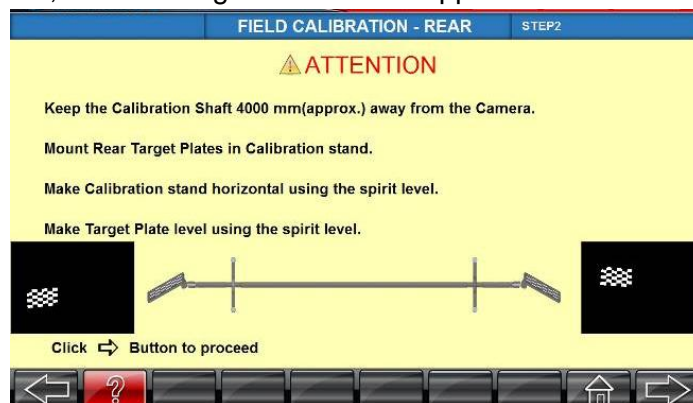
Fig. 129

Remove the Front Target plates from the stand and fix the Rear Target plates. Relocate the Calibration stand at the Rear distance (4000mm) as shown in the screen and level them. Press **NEXT SCREEN** button to go to Target plate identification screen.
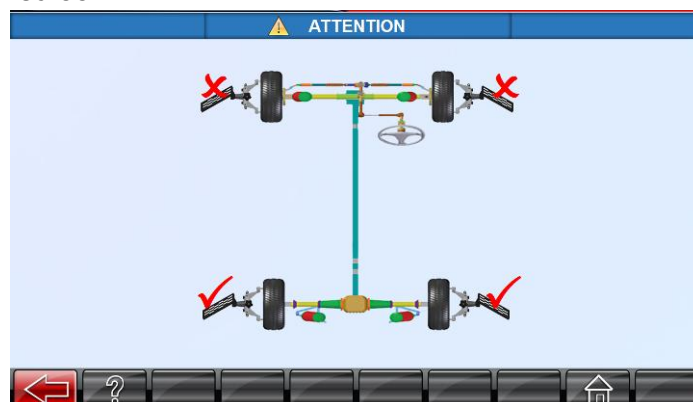
Fig. 130

Once the images of the Target plates are identified, following screens will displayed:
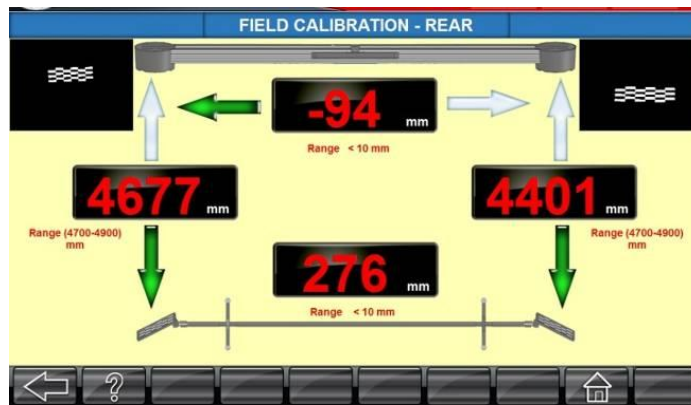
Fig. 131

Move the Calibration stand forward or backward as guided (arrow blinking) by the system on the screen to get equal distance (RLZD = RRZD) between the Camera to the Rear Target plates for Left & Right side. Once the distance is achieved, move the Calibration stand in horizontal direction either Left of Right side as guided by the system on the screen. The readings will become green after achieving the all the readings are within ±1mm. Try to get the difference values zero for the Distance and shift values for better accuracy. Ensure spirit level once again. Click **SAVE** button to save the Rear Distance values. The following screen will displayed:

Fig. 132

Press **NEXT SCREEN** button:
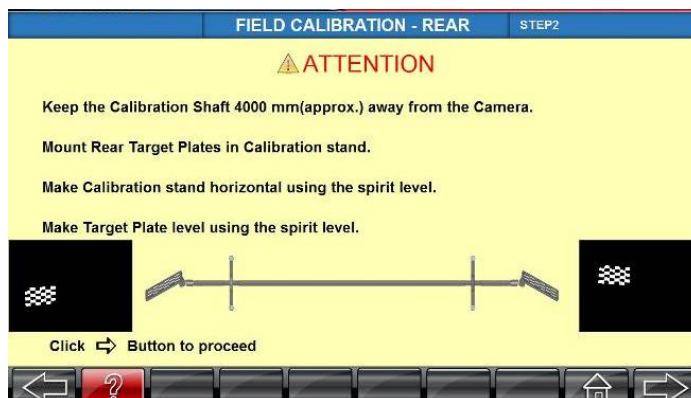
Fig. 133

Press **NEXT SCREEN** button to go to Target plate identification screen.
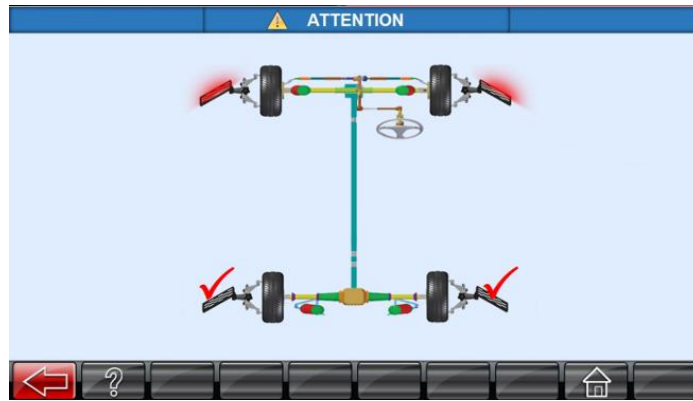
Fig. 134

Once the images of the target plates are identified, the following screens will displayed:

Fig. 135

Move the Calibration stand forward or backward as guided (arrow blinking) by the system on the screen to get equal distance (RLZD = RRZD) between the Camera to the Rear Target plates for left & right side.

Once the distance is achieved, move the Calibration stand in horizontal direction either left of right side as guided by the system on the screen. The readings will become green after achieving the all the readings are within ±1mm. Try to get the difference values zero for the distance and shift values for better accuracy. Ensure spirit level once again.
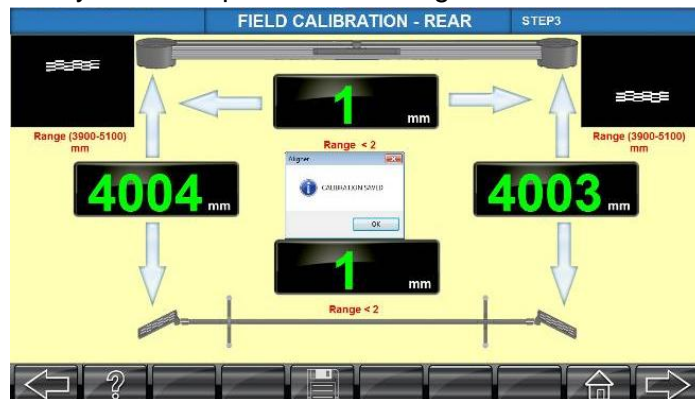
Fig. 136

Click **SAVE** button to save the angle zero offset values. After saving the zero offset, the following screen will be displayed.

Fig. 137

Note: If you want to calibrate the target plate error calibration, click the target plate calibration button and follow the screen guided steps.

Press **NEXT SCREEN** button to go to front angle zero offset save option.

Shift the Calibration kit from rear location to front. Place the kit on the rotary plates (turn tables) at the distance (2000mm) as shown in the screen and level the shaft using the spirit level. Remove the rear image plates & Mount the front target plates in the respective locations (i.e. left image plate on Left side and right image plate on Right side of the calibration kit) and level them. Press **NEXT SCREEN** button to go to Target plate identification screen.
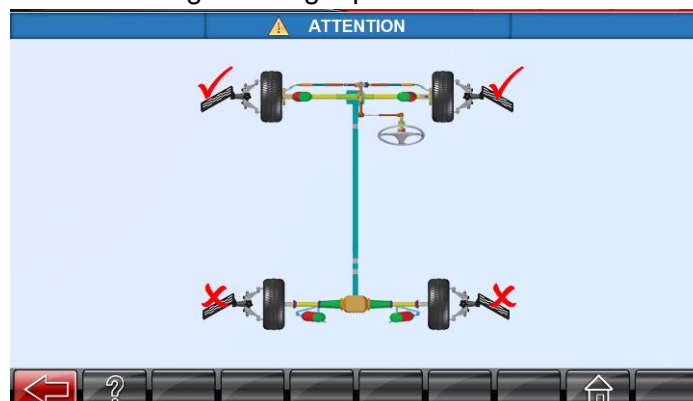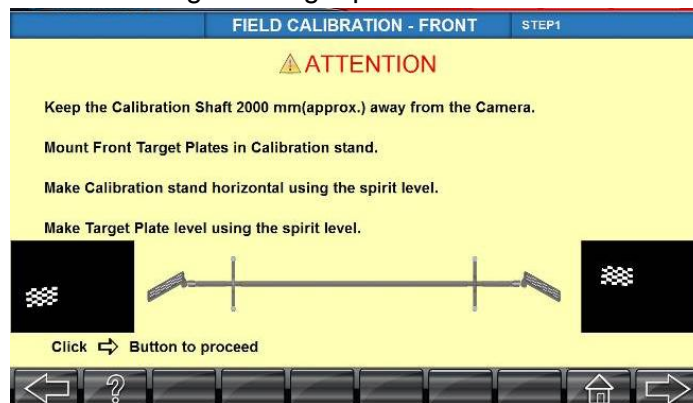

Fig. 138
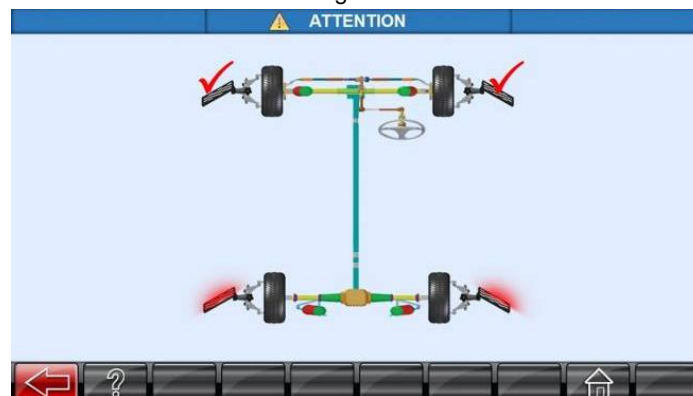
Fig. 139

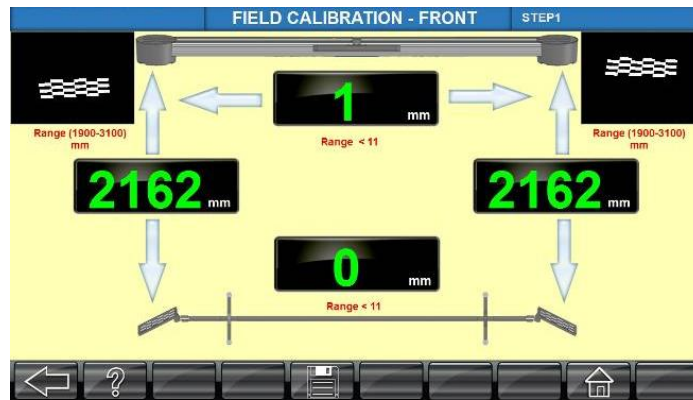Once the images of the target plates are identified, the following screens will displayed. Move the Calibration stand forward or backward as guided (arrow blinking) by the system on the screen to get equal distance between the Camera to the front Target plates for left & right side (FLZD =FRZD). Once the distance is achieved, move the Calibration stand in horizontal direction either left of right side as guided (arrow blinking) by the system on the screen.

The readings will become green after achieving the all the readings are within ±1mm. Try to achieve the difference values zero for the distance (ZD) and horizontal (XD) values for better accuracy. Ensure the spirit level again.
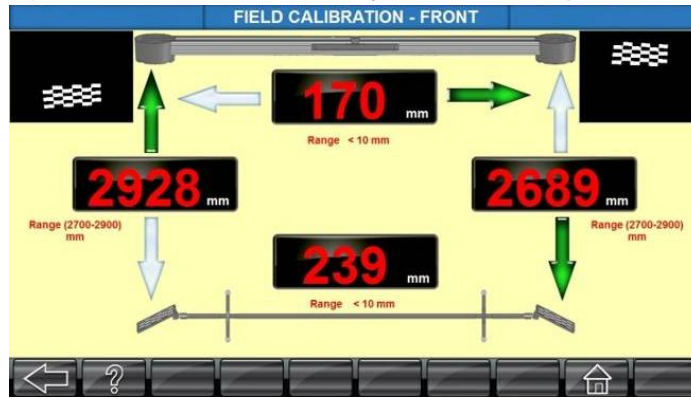
Fig. 140

Move the calibration kit as per the blinking arrows in the screen.
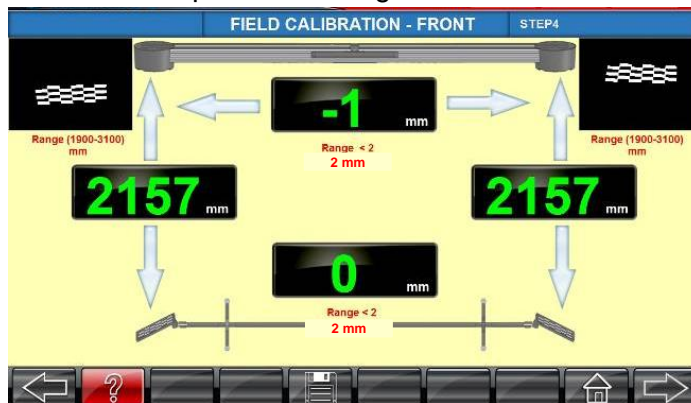
Fig. 141
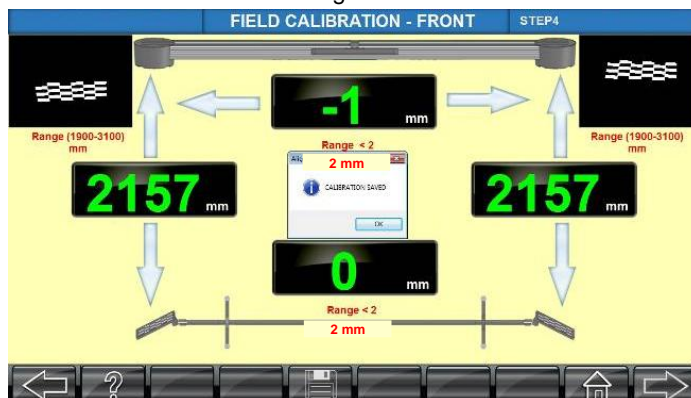
Fig. 142

Click **SAVE** button to save the Front zero offset values. After saving the zero offset values, the following screen will appear:

Fig. 143

Note: If you want to calibrate the target plate error calibration, click the target plate calibration button and follow the screen guided steps.

Press **NEXT SCREEN** button to go to next screen to complete calibration done information by feeding the name of the personnel.
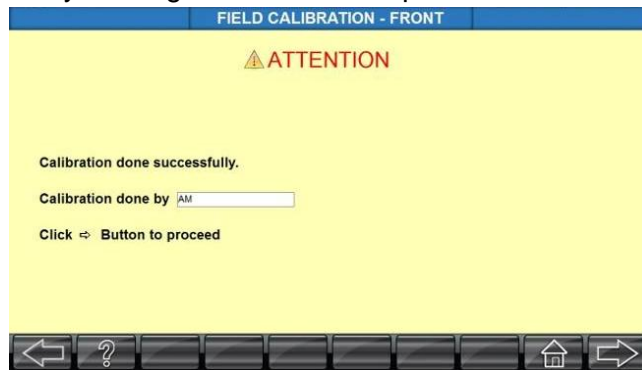
Fig. 144

Press **NEXT SCREEN** button to exit from calibration.

7.4.3. TARGET PLATE CALIBRATION (Only for spare replacement)

☞	**This feature should be used only by authorised Service personnel. Hence User should not enter into this module**
☞	**Target plates provided with the equipment are calibrated at Factory itself and the data are stored in the system. Hence field calibration need not be done. However in case of replacement, Target plate calibration should be done & the data files provided along with new Target plates should be updated into the system**
☞	**This option facilitates replacement of any one of the Target plate also. The respective check box should be selected in the screen while calibrating that particular Target plate**

Click **TARGET PLATE CALIBRATION** from **Calibration** options in *Settings* screen to calibrate the Target plate and save the data into the system. Follow the on-screen instructions:

Check the Target plate ID check box in the screen and press **SAVE** button as shown below:
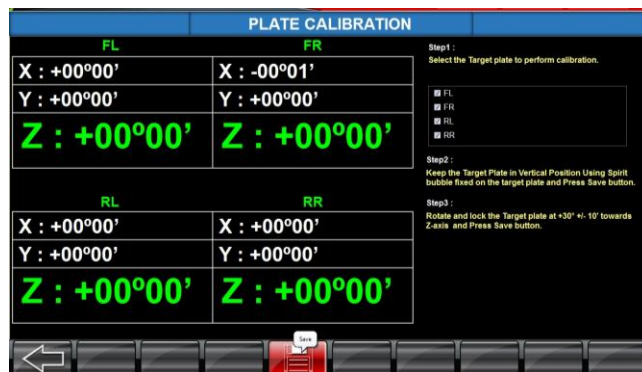
Fig. 145

Tilt all the Target plates to 30° as shown below:
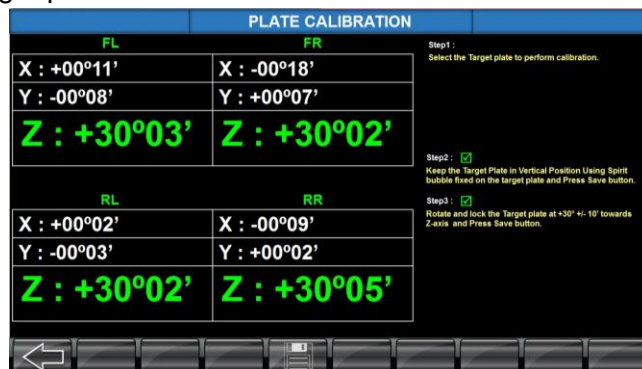
Fig. 146

Press **SAVE** button to store the image plate error readings (IPR) of all Target plates. Now the machine is ready for the wheel alignment operation.

7.5. CALIBRATION CHECK

☞	This feature should be used only by authorised Service personnel. Hence User should not enter into this module

Click **CALIBRATION CHECK** in the Settings screens to check and ensure the calibration data of the Equipment, Target plates & Camera carried out so far.

Fig. 147

7.6. CALIBRATION CERTIFICATE

☞	This feature should be used only by authorised Service personnel. Hence User should not enter into this module

Click **CALIBRATION CERTIFICATE** in the Settings screens to view / print / export the calibration information as a certificate.

Fig. 148

7.7. AUTOBOOM TEST

7.8. MANUAL (SELF) CALIBRATION

8. SYSTEM SETTINGS

⚠️	**Only permit qualified personnel to operate, maintain or repair the Aligner**
❗	**To avoid damaging important files, it is necessary to shut down Windows properly before turning OFF or restarting the aligner**
☞	**Online help can be accessed from all the screens by pressing F1 key to guide the user while performing alignment and to know about the active keys available in that particular screen**

Settings option is to perform all system related activities, such as Vehicle specifications, Calibration, Testing etc. Since this is a critical function dealing with alignment specifications, etc., a Password (Default password: mas algn) is given to the customer for access.

Service personnel can enter into this Option by clicking **SETTINGS** in the *Welcome* Screen and by providing the Password.

Fig. 149

The following Menu will be displayed:

Vehicle specifications Ref. chapter 7.7.1 of Operating manual	Measurement units Ref. chapter 7.7.2 of Operating manual	Alignment data Ref. chapter 7.7.3 of Operating manual	Calibration Refer chapter 7.1	Calibration certificate Refer chapter 7.6
Workshop information Ref. chapter 7.7.4 of Operating manual	Calibration history Ref. chapter 7.7.5 of Operating manual	OEM wizard Ref. chapter 7.7.6 of Operating manual	Calibration check Refer chapter 7.5	Distributor information Refer chapter 8.5
Multi-user Ref. chapter 7.7.7 of Operating manual	Backup & Restore factory calibration Ref. chapter 7.7.8 of Operating manual	Camera testing Refer chapter 8.1	Left/Right Steering wheel setting Refer chapter 8.4	
Reset Job number Ref. chapter 7.7.9 of Operating manual	Settings password Ref. chapter 7.7.10 of Operating manual	Camera vision setting Refer chapter 8.3	Camera configuration Refer chapter 8.2	

8.1. CAMERA TESTING

	This feature should be used only by authorised Service personnel. Hence User should not enter into this module

Click **CAMERA TESTING** in the settings screens and check the target images are clearly visible in the screen.
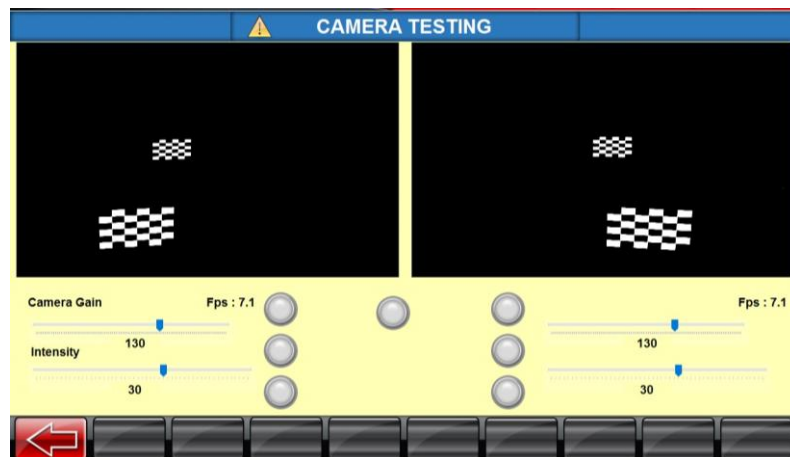
Fig. 150

The Camera gain and intensity are set by default. If the gain is disturbed, set the Camera gain as 40 & intensity as 25 (for ISH series – Gain: 115 & Intensity: 25) for the respective Left & Right Camera as shown above.

8.2. CAMERA CONFIGURATION (Only for spare replacement)

	This feature should be used only by authorised Service personnel. Hence User should not enter into this module

This option is provided to configur the Camera ID for the respective Camera (LH & RH) mounted in the Horizontal beam.
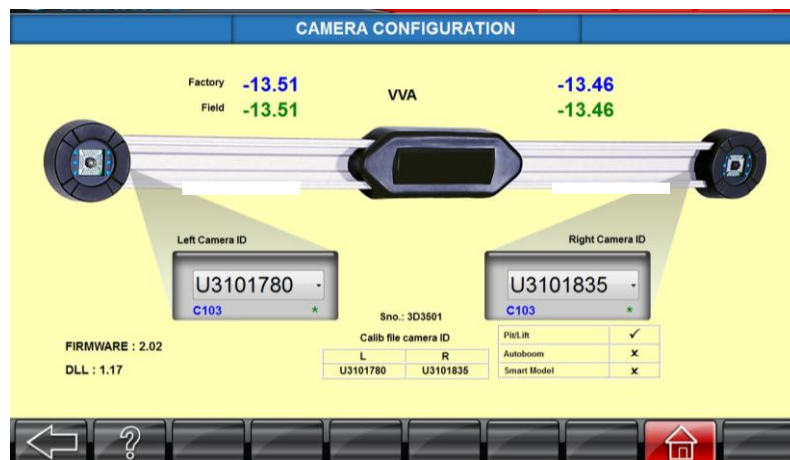
Fig. 151

	If PC is not supplied by Manufacturer, refer the camslno.txt file provided in the software CD and assign the Camera Sl.No. for the respective Camera location and press SAVE button

8.3. CAMERA VISION SETTING (Only for spare replacement)

> ☞ **This feature should be used only by authorised Service personnel. Hence User should not enter into this module**

Click **CAMERA VISION SETTING** in the settings screens to adjust both the Camera vision for parallelism

1. Fix the new camera and tighten the M6 screws.

Fig. 152

2. Now, ensure both Left & Right XD distance will be equal in values. If not, proceed for Camera calibration.
3. Mount the Front Target plate at 2.8mtr (For Smart models – 2mtr) and Rear Target plate in calibration stand.
4. Follow the Camera calibration procedure.

8.4. LEFT / RIGHT STEERING WHEEL SETTING

> ☞ **This feature should be used only by authorised Service personnel. Hence User should not enter into this module**

This screen provides the following settings:

Fig. 153

1. Option to select either Right hand drive or Left hand drive vehicle, according to the type of vehicle being considered for alignment.
2. Option to select either Odometer entry is required or not.
3. Option to select Scissor Lift or Pit model.

Press **SAVE** button

8.5. DISTRIBUTOR INFORMATION

> ☞ **This feature should be used only by authorised Service personnel. Hence User should not enter into this module**

This option is provided to enter the Distributor Name, address and to add Logo, which will be reflected in the Result printout & outputs.

9. PARTS REPLACEMENT PROCEDURE

9.1. HORIZONTAL BEAM

9.1.1. CAMERA (LH & RH)

> ☞ **After replacing the RH Camera, ensure the image is displayed upside down in Camera view screen**

1. Before replacing the defective Camera, ensure the following points:
   a. Make sure the Camera is free from any external damage.
   b. Make sure the CD dispatched along with the Camera is readable.
   c. System is switched off and the mains supply is disconnected from the equipment.
   d. If Left camera needs to be replaced, ensure following files are available in the CD:

USB2.0	USB3.0
Calib_3D.mdb	Calib_3D_L.mdb
Camdata_L.dat	Camdata_L.dat

   e. If Right camera needs to be replaced, ensure following files are available in the CD:

USB2.0	USB3.0
Calib_3D.mdb	Calib_3D_R.mdb
Camdata_R.dat	Camdata_R.dat

2. Remove the respective Camera cover screw & Back plate screw.
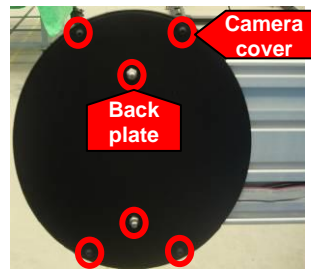
3. Disconnect the Power cables and 10Pin FRC (ribbon) cable. Also, disconnect the Camera power USB cables.
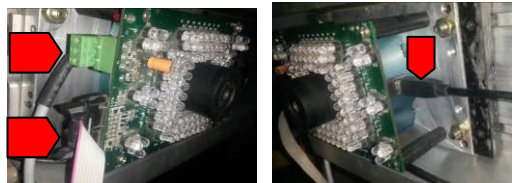
4. Remove IR LED board by unscrewing its M3x6 PH screws.
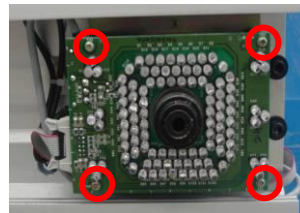
5. Unscrew the Camera fixing Allen screws & remove the Camera from Horizontal beam.

USB2.0	USB3.0

6. Fix new Camera assembly with Horizontal beam & ensure the following: Camera fixed in correct locations Sticker is always at top

7. **Camera data file restoration**:

a. Single Camera data file installation

Insert the CD and execute the "**Camera replace.exe" program**. *Camera calibration update* screen will appear as shown below:

Select the required file from CD / USB stick & press **OK**. Calibration data will be automatically updated with the message shown. Click **OK** to finish.
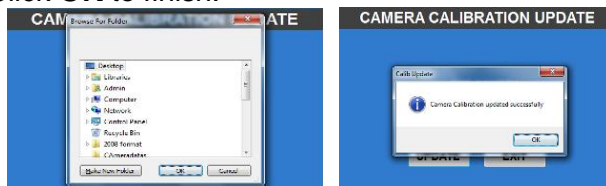
b. Two Camera data file installation

Execute the wheel alignment software. System will display *Restore the camera files* screen.
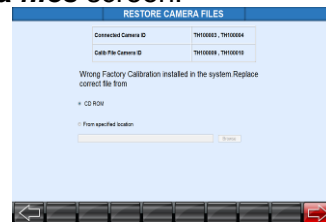
Select CD / USB stick & click on the arrow at the right bottom of screen

Camera files will automatically get updated & system comes to *Welcome* screen.

8. Start running the wheel alignment program and perform *Camera calibration* as explained in Chapter 7.4.

Before calibration, ensure the Camera image is displayed upside down in *Camera view* screen as shown below:
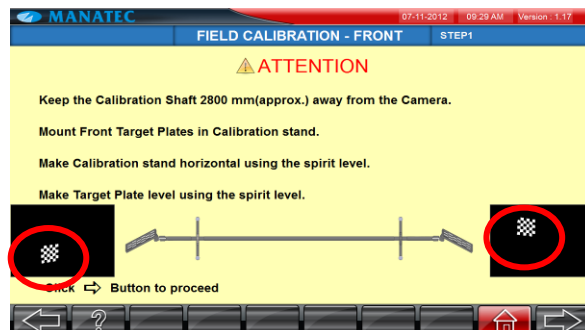
9. Perform *Target plate calibration* as explained in Chapter 7.4.3.

10. Now fix the Camera back plate and close the Camera assembly with Camera cover.

11. Ensure the equipment functions by verifying the results.

9.1.2. IR LED BOARD

1. Remove the respective Camera cover fixed with the Back plate.

Camera cover screw
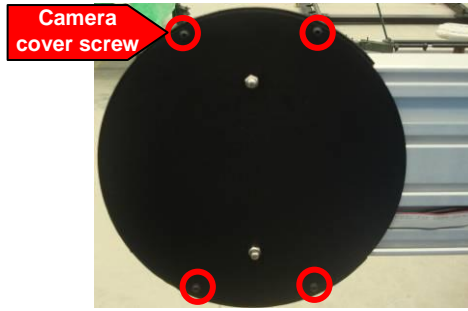
2. Disconnect the IR LED cable & 10Pin FRC cable.

USB2.0	USB3.0
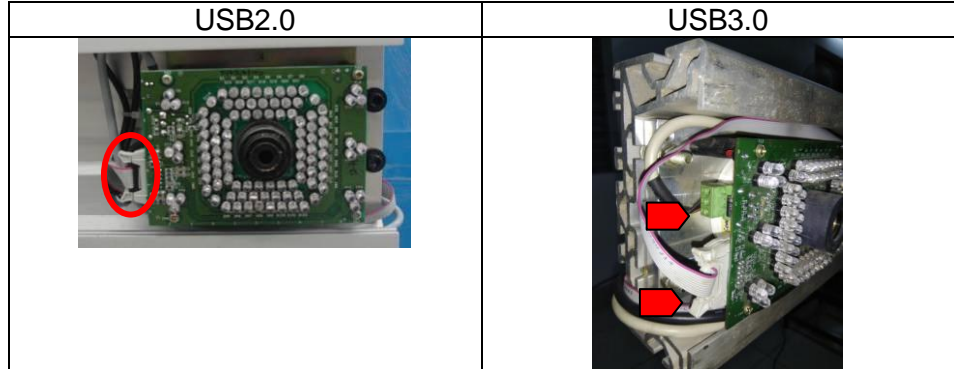
3. Remove the IR LED board by unscrewing its M3x6 PH screws.
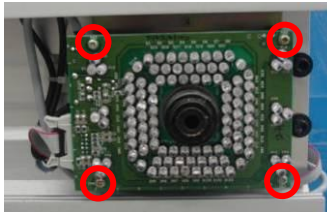
4. Replace the defective board with new IR LED board.and restore the IR LED power cable.
5. Run the alignment program and go to *Settings* option. Provide the required password (mas<space>algn) and select *Camera testing.*
6. Ensure the Camera gain & intensity as explained in Chapter 8.1. Also ensure the Target plates are displayed properly.
7. Re-fix the Camera cover with Back plate in Horizontal beam.
8. Ensure the equipment functions without any errors.

9.1.3. LED DRIVER BOARD & HUB BOARD

1. Remove the Hub board cover

Pit model	Lift model
For AVH model, refer Fig.22	
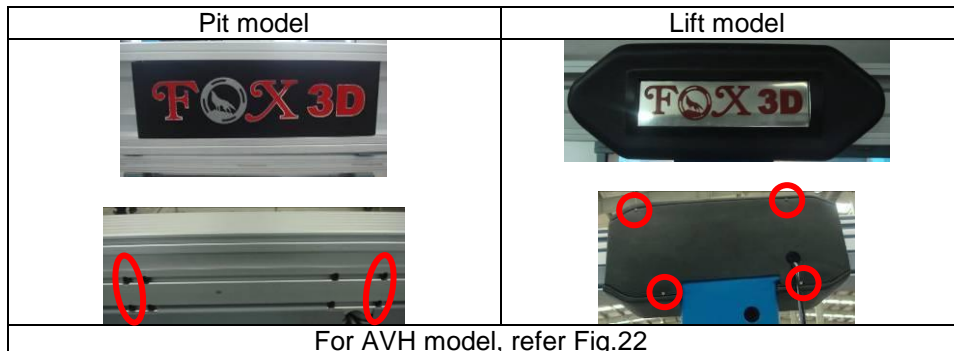
2. Remove all the power connections from LED Driver board & Hub board.

USB2.0	USB3.0
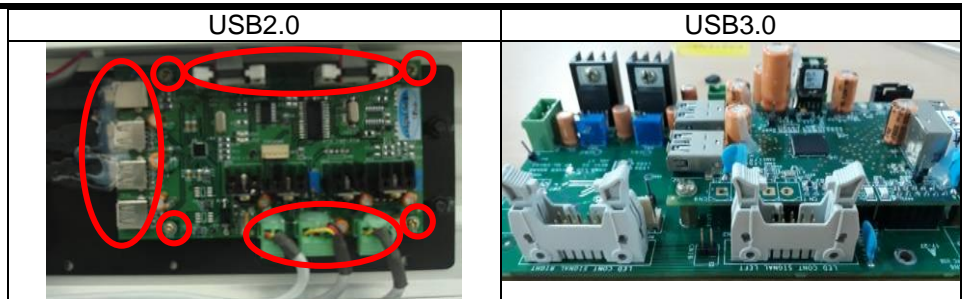
3. Remove the LED Driver board from the Hub board fixing plate.
4. Replace the defective LED Driver board with new board and restore the power connections.
5. Check & ensure the input voltage to IR LED board is 9VDC. If not, adjust the Trimpot to achieve the required voltage.

USB2.0	USB3.0
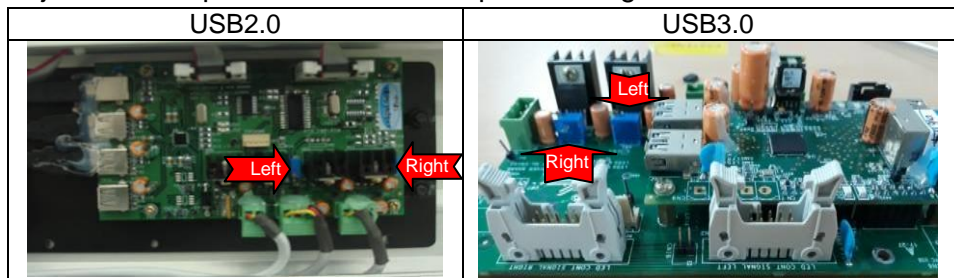
6. Ensure the Camera gain & intensity as explained in *Camera testing* (Chapter 8.1). Also ensure the Target plates are displayed properly.
7. Re-fix the Hub board cover / Front facia.
8. Ensure the equipment functions without any errors.

In case of replacing the Hub board alone,

1. Remove the Hub board from the LED Driver board.
2. Replace the defective Hub board and restore the connections.
3. Re-fix the Hub board cover.
4. Ensure the equipment functions without any errors.

9.2. INTERFACE BOX

9.2.1. EMI FILTER BOARD / MOTOR CONTROL BOARD

1. Open the Interface box top cover by removing the Allen screws using 3mm Alley key.

2. Remove the EMI Filter board & SMPS safety cover.
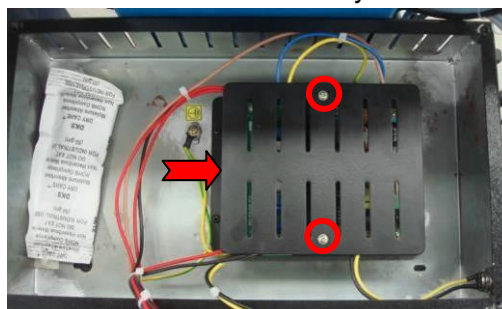
3. Replace the defective board with new Board and re-fix it. Restore all the connections.

4. Power up the system. Check & ensure the Input & Output voltage (230V AC) at the respective sections of the EMI Filter board with the help of Multimeter.

5. Ensure the Alignment program is running.
6. Close the Safety and then Interface box top cover.

9.2.2. SMPS

1. Open the Interface box top cover by removing the Allen screws using 3mm Alley key.
2. Remove the EMI Filter board & SMPS safety cover.
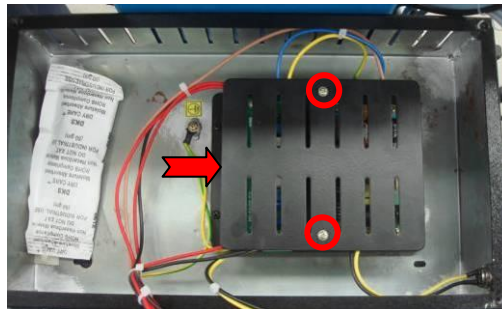
3. Replace the defective SMPS with new SMPS and re-fix it. Restore all the connections.
4. Power up the system. Check & ensure Input (230VAC) & Output voltage (12VDC) at respective sections of the SMPS with the help of Multimeter.
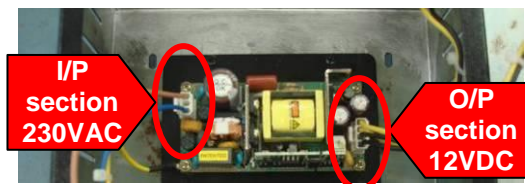
5. Ensure the Alignment program is running.
6. Close the Safety and then Interface box top cover.

9.2.3. MOV BOARD (Applicable only for AVH model)

1. Open the Interface box top cover by removing the Allen screws using 3mm Alley key.

2. Remove the EMI Filter board & SMPS safety cover.
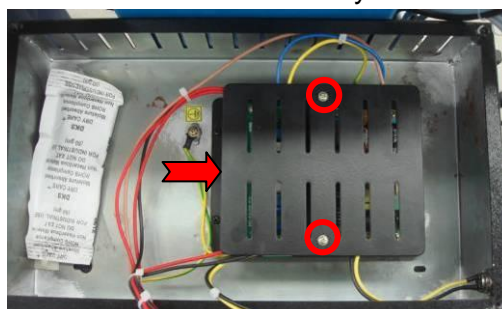
3. Replace the defective board with new MOV Board and re-fix it. Restore all the connections.
4. Power up the system. Check & ensure Input & Output voltage (230V AC) at respective sections of EMI Filter board with the help of Multimeter.
5. Ensure the Alignment program is running.
6. Close the Safety and then Interface box top cover.

9.3. VERTICAL COLUMN (Applicable only for AVH model)

9.3.1. POWER NUT
1. Remove the Bellows and dismantle the Front cover.
2. Move the Saddle plate to top most point.
3. Remove the Mechanical stopper.
4. Disconnect the Limit switch wirings and remove the Top plate.
5. Unscrew the Power nut from Saddle plate and then remove the Saddle plate.
6. Replace the Power nut in the Saddle plate and restore it.
7. Re-fix the Mechanical stopper by ensuring a gap of 5mm between the bottom phase to Guide bush top phase.
8. Fix the Top plate and then do the wirings again for Limit switch.
9. Fix the Front cover & finally Bellows.

9.3.2. BELT
1. Remove the Motor cover.
2. Loosen the Motor fixing bolt and remove the worn out belt from Motor pulley.
3. Replace the belt with new one
4. Tighten the Motor fixing bolt.
5. Ensure the tightness of belt.

9.4. TARGET PLATE
1. Fix the New Target plate with Calibration kit.
2. Run the alignment program and go to Settings option. Provide the required password (mas<space>algn) and select *Camera testing*.
3. Ensure the Camera gain & intensity as explained in Chapter 8.1. Also ensure the Target plates are displayed corrected.
4. Perform *Calibration* as explained in Chapter 7.4.
5. Then calibrate the respective Target plate as explained in Chapter 7.4.3.
6. Ensure the equipment functions without any errors.

9.5. PERSONAL COMPUTER

☞ **Alignment PC software & Calibration data are pre-loaded in the Desktop computer if supplied by Manufacturer**

Following procedures are to be done in case if the PC is arranged by Customer himself or during re-installation:
1. Disconnect all the connections from the PC and replace the defective PC with new Computer and re-fasten it again.
2. Restore all the connections.
3. Install the Windows OS & Alignment PC software as explained in Chapter 6.1.
4. Restore Factory calibration data from the Optical media provided by Manufacturer or other external device to PC as explained in Chapter 7.7.8 respectively.
5. Install International Vehicle data (Autodata) as explained in Chapter 6.2 & enable the feature as explained in Chapter 7.7.10.1 (Lock details) of Operating manual.
   NOTE : Refer scope of supply for availability of this feature

10. DIAGRAMS
10.1. BLOCK DIAGRAM

Monitor

Camera-LH
IR LED board

LED Driver &
Hub board

Camera-RH
IR LED board

Power panel

Personal Computer

Keyboard

Mouse
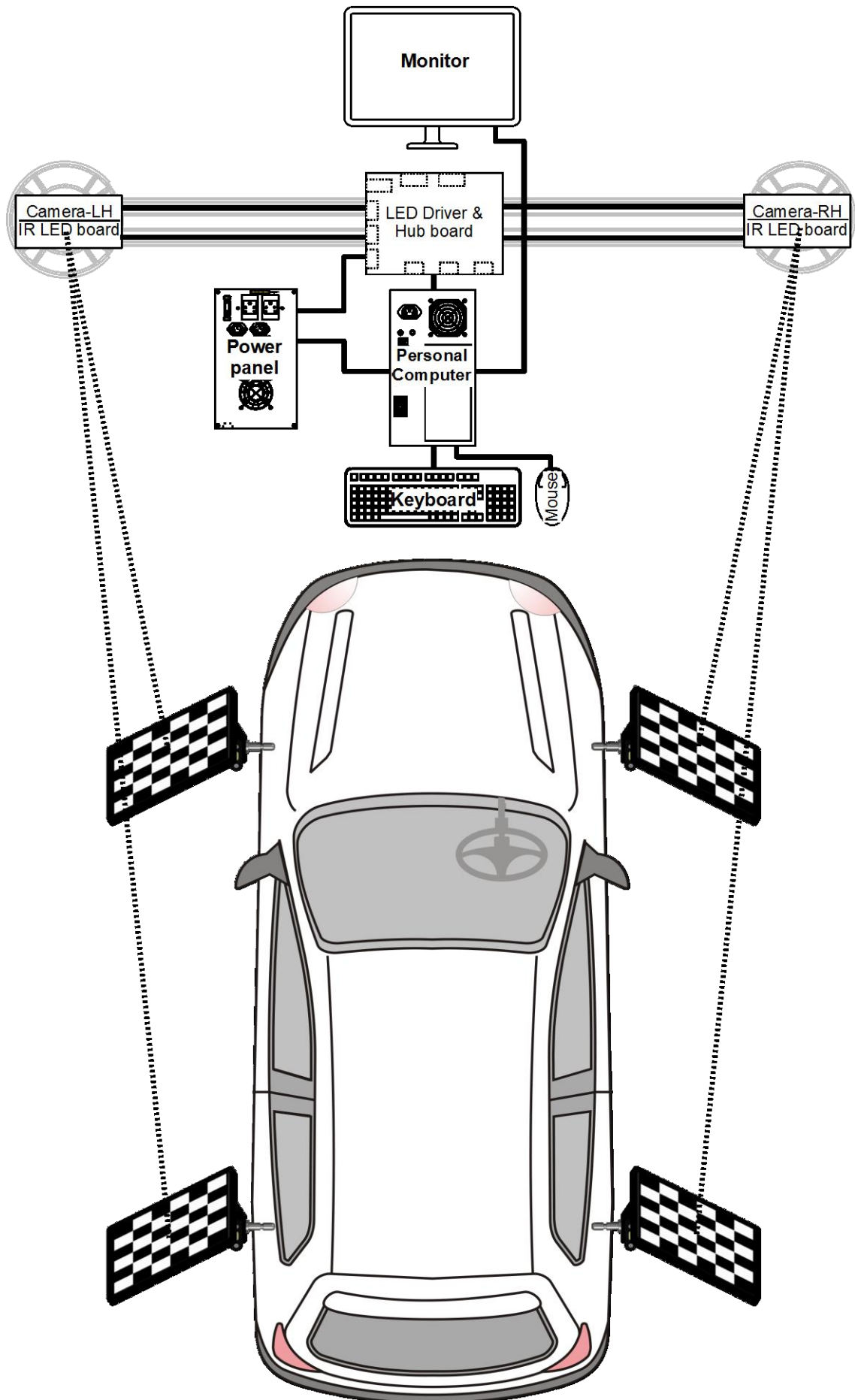
Fig. 154

INTERFACE BOX WIRING DIAGRAM

COMPONENTS	230V	110V
1. FUSE F1, 1/2"	3 AMPS	3 AMPS
2. FUSE F2, 1/2"	5 AMPS	5 AMPS
3. MCB	6 AMPS	10 AMPS

Fan
+12V (RED) 1
GND (Black) 2

2 PIN BSM MALE
SOLDER SIDE

+12V (Yellow)-LAPP CABLE
GND (Black)-LAPP CABLE

500mm
500mm

O/P
+12V (YELLOW)
+12V (YELLOW)
GND (BLACK)
GND (BLACK)
1 2 3 4
TB2

SMPS
SNP-Z057 / EPS-65-12
I/P
L N
TB1
E
SMPS EARTH
5

(RED) 1Sq. mm
(BLACK) 1Sq. mm

3PIN TOP 6A/250V
PIN SIDE VIEW
BLACK
YEL/GRN
RED
L N E
2POLE MCB
N L. TOP
BOTTOM

NOTE: 2pole MCB TOP - Connect the AC IN (3pin TOP L & N)
BOTTOM - POWER socket

3-CORE CABLE 1Sq. mm - 2.5mtr.

E
3
P
N
I/F BOX 3PIN/5PIN
PWR SOCKET

UPS
IN
OUT

EMI
FILTER
BOARD
B1-CN2
L N E
O/P
1 2 3
B1-CN1
E N L
I/P
3 2 1
EMI EARTH
NEUTRAL
LINE

TORROIDAL (E0823)
6 TURNS
4

FROM UPS O/P
E N
2
F1
3 Amps
F2
5 Amps

SPEAKER
POWER
E
P N

MONITOR
POWER
E
P N

PC
POWER
E
N

EARTH STRIP
DOWEL PINS
1 2 3 4 5

NOTE:
1 TO 3PIN TOP
2 TO 3PIN AC SOCKET
3 TO 5 PIN AC SCKT
4 TO EMI EARTH
5 TO SMPS EARTH

LINE - RED WIRE 1sqmm
NEUTRAL - BLACK WIRE 1sqmm
EARTH - YELLOW/GREEN 1sqmm

Fig. 155

FOR CE MODELS

LED DRIVER BOARD TO IR LED BOARD

1	GND	WHITE /	**YEL GRN**
2	+12V IR	BROWN /	**BLK1**
3	+12V	GREEN /	**BLK2**

SHIELD

GND — 1
+12V IR — 2
+12V — 3

3 PIN PHOENIX FEMALE

3 PIN PHOENIX FEMALE

3-CORE SHIELDED CABLE   1800mm (LEFT SIDE)
2200mm (RIGHT SIDE)

LAPP PART: 0034503 /
IGUS Part: CF881.05.03

INTERFACE BOX TO LED DRIVER BOARD

BROWN / **BLK1 & BLK2**
WHITE / **YEL GRN**
SHIELD

+12V — 2
GND — 1

2 PIN PHOENIX FEMALE

TO CN11 OF LED DRIVER & HUB BOARD

+12V
GND

2 PIN BSM FEMALE
SOLDER SIDE

2-CORE SHIELDED CABLE   1500mm (PT MODEL)
3100mm (VH MODEL)
4000mm (WALL MOUNT MODEL)

LAPP PART NO.: 0034402
IGUS Part: CF881.05.03

FOR NON CE MODELS

LED DRIVER BOARD TO IR LED BOARD

1	GND	GREEN & BLACK
2	+12V IR	RED
3	+12V	YELLOW

SHIELD

GND — 1
+12V IR — 2
+12V — 3

3 PIN PHOENIX FEMALE

3 PIN PHOENIX FEMALE

4-CORE SHIELDED CABLE   1800mm (LEFT SIDE)
2200mm (RIGHT SIDE)

INTERFACE BOX TO LED DRIVER BOARD

RED & YELLOW
GREEN & BLACK
SHIELD

+12V — 2
GND — 1

2 PIN PHOENIX FEMALE

TO CN11 OF LED DRIVER & HUB BOARD

+12V
GND

2 PIN BSM FEMALE
SOLDER SIDE

4-CORE SHIELDED CABLE   1500mm (PT MODEL)
3100mm (VH MODEL)
4000mm (WALL MOUNT MODEL)
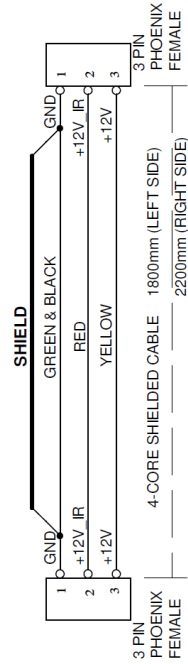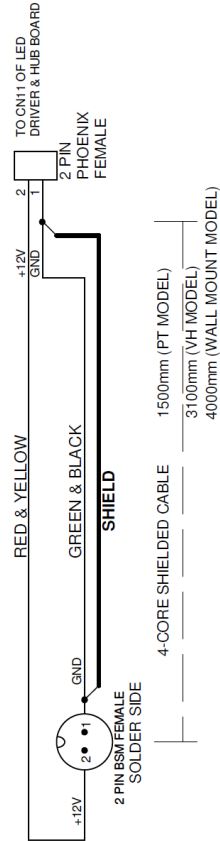
NOTE: Shield must be connected to ground at both ends of core cables

Fig. 156

3PIN AC PWR SOCKET(F)

CN2
3PIN AC PWR SOCKET(F)

(YEL/GRN) 1Sq. mm

CN1
3PIN AC PWR SOCKET (M) WITH FUSE
F1 — 3 Amps AC I/P
230V AC I/P

(BLACK / BLUE)

(RED / BROWN) 1Sq. mm

CAPACITOR 10uF / 40uF

RED
YELLOW
BLACK
E
MOTOR 230V

SMPS SNP-Z057
I/P L N TB1

O/P
1 +12V
2 +12V
3 GND
4 GND

CABLE 1Sq. mm - 300mm

6 RED
3 YELLOW
5 RED
2 BLUE
1 GREEN
6PIN PWR MATE (F)

6PIN PWR MATE (M)

+12V (Yellow)-LAPP CABLE
GND (Black)-LAPP CABLE
+12V (Yellow)-LAPP CABLE
GND (Black)-LAPP CABLE

200mm

Fan

UPS
OUT
IN

CN3
I/F BOX 3PIN/5PIN PWR SOCKET

4-CORE CABLE 1Sq. mm - 550mm

DOWN (RED)
NUTRL (BLUE)
UP (YELLOW)
GREEN

F2 4uF
4uF OPTIONAL

MONITOR -CN7
TRANSFORMER / SMPS - CN6
RES. -CN5
MOTOR - CN8

DC 1
NEUTRAL 2
PHASE 1 3
PHASE 4

EMI & MOTOR CONTROL BRD

MOTOR ON - CN3
UP

DOWN ON
UP ON

GND (Black)-LAPP CABLE
GND (Black)-LAPP CABLE

6PIN BSM-M

+12V (Yellow) -14/36

UP LIMIT SW 4
DOWN LIMIT SW 3

4PIN BSM-M
+12V YELLOW -14/36

+12V (Yellow) -14/36

230V AC I/P - CN2
BRAKE - CN1
HEADER 2 DOWN

+12V (Yellow) -14/36

MOV BRD
3 E
2 N
1 P
OUT
3 E
2 N
1 P
IN

3-CORE CABLE 1Sq. mm - 3mtr.
EARTH

TORROIDAL (E0823)
6 TURNS

TOP BOTTOM
2POLE MCB

BLACK
YEL/GRN
RED

3PIN TOP 6A/250V PIN SIDE VIEW

NOTE: 2pole MCB TOP - Connect the AC IN (3pin TOP L & N)
BOTTOM - Connect MOV board

1 FROM AC MAINS
2 TO MOV BOARD
3 TO 5PIN AC SOCKET
4 TO MOTOR
5 TO SMPS
6 TO 3PIN AC SOCKET

DOWEL PINS
TO I/F BOX TOP INSERT
EARTH STRIP 5PIN

COMPONENTS	230V	110V
1. FUSE F2, 1/2"	3 AMPS	3 AMPS
2. MCB	6 AMPS	6 AMPS
3. MOTOR CAPACITOR	10uF / 440V	40uF / 250V

Fig. 157

X0871- HARNESS, 6PIN PWR MATE (M)
MOTOR CABLE, 550mm

X0872- HARNESS, 6PIN PWR MATE (F)
MOTOR CABLE, 300mm

X0838 - HARNESS, LED DRIVER BOARD TO IR LED BOARD, 2200mm
X0837 - HARNESS, LED DRIVER BOARD TO IR LED BOARD, 1800mm
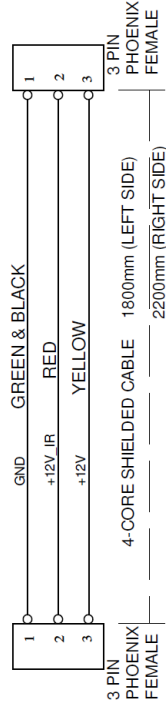
X0841 - HARNESS, 6PIN BSM FEMALE TO FEMALE, 1 : 1, 3750mm

X0842 - HARNESS, 4PIN BSM FEMALE TO LUGS, 3750mm & 400mm

X0839 - HARNESS, INTERFACE BOX TO LED DRIVER & HUB BOARD, 400mm
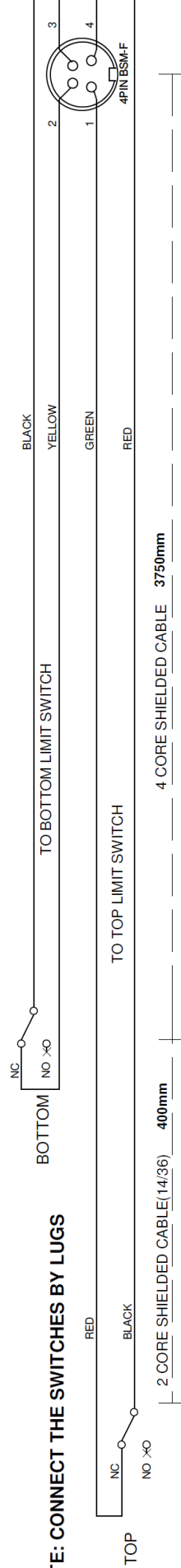
NOTE: CONNECT THE SWITCHES BY LUGS

NOTE: INSERT 4CORE SHIELDED CABLE 3750mm, 6CORE SHIELDED CABLE 3750mm AND USB CABLES INTO THE BRAIDED SLEEVE BEFORE SOLDERING THE 4PIN AND 6PIN BSM CONNECTORS.

Fig. 158

DOWN (RED)
UP (YELLOW)
NUTRL (BLUE)
EARTH (GREEN)

4-CORE CABLE 1Sq. mm - 550mm

6PIN PWR MATE (M)

CABLE 1Sq. mm - 300mm

RED
YELLOW
RED
YELLOW
BLUE
GREEN

6PIN PWR MATE (F)

GND   GREEN & BLACK
+12V IR   RED
+12V   YELLOW

3 PIN PHOENIX FEMALE

4-CORE SHIELDED CABLE   1800mm (LEFT SIDE)
2200mm (RIGHT SIDE)

3 PIN PHOENIX FEMALE

SHIELD
BLUE
BLACK
YELLOW
GREEN
WHITE
RED

6PIN BSM-F

6 CORE SHIELDED CABLE   3750mm

6PIN BSM-F

TO CN8 OF LED DRIVER & HUB BOARD

TO CN11 OF LED DRIVER & HUB BOARD

5PIN SR FEMALE

2PIN PHNX FEMALE

TOP HOM   YELLOW
UP   RED
DWN   BROWN
DWN HOM   BLACK
+12V   RED
GND   BLACK
SHIELD
BLUE

6PIN BSM-M

6 CORE SHIELDED CABLE(14/36)   400mm

TO BOTTOM LIMIT SWITCH

BLACK
YELLOW
GREEN
RED

4PIN BSM-F

4 CORE SHIELDED CABLE   3750mm

TO TOP LIMIT SWITCH

BOTTOM   NC   NO

TOP   NC   NO

RED
BLACK

2 CORE SHIELDED CABLE(14/36)   400mm

WHITE LED BOX

12 LEDs

12 LEDs

WHITE

22E, 1W

X0968 : CABLE ASSY, LED DRIVER BOARD TO CAMERA, 5000mm

LED DRIVER BOARD TO IR LED BOARD

YELLOW & GREEN

5000mm

1Sq mm

DOWEL

DOWEL

SHIELD

GND	GREEN /	YEL GRN	GND
+12V_IR	BROWN /	BLK1	+12V_IR
+12V	WHITE /	BLK2	+12V

FROM LED DRIVER BOARD

3 PIN PHOENIX FEMALE

3-CORE SHIELDED CABLE

5000mm (LEFT)
750mm (RIGHT)

LAPP PART: 0034503 /
IGUS Part: CF881.05.03

TO IR LED BOARD

3 PIN PHOENIX FEMALE

X0967 : CABLE ASSY, I/F BOX TO LED DRIVER BOARD WITH USB3.0, 5000mm

5PIN BSM-FEMALE

+12V   BLK1
        BLK2
+12V   BLK3

+12V

GND   YEL GRN
GND   SHIELD

2 PIN PHOENIX FEMALE

4-CORE SHIELDED CABLE

YELLOW & GREEN

5000mm

DOWEL

DOWEL

1Sq mm

E2665 - HARNESS; MOLEX; 2PIN; F; 400MM

2PIN MOLEX (F)
538-50-84-1020 (42022)

RED

BLACK

400 mm 1sq.mm wire

E8121 - HARNESS; MOLEX; 2PIN; M; 400MM

2PIN MOLEX (M)
(42021)

RED

BLACK

400 mm 1sq.mm wire

2 CORE WIRE - 2 MTR

2 PIN BSM FEMALE
SOLDER SIDE

+12V

GND

FROM INTERFACE BOX

NOTE: 1. Shield must be connected to ground at both ends of core cables
2. X0967 & X0968 SHOULD BE ROUTED THRO' BRAIDED SLEEVE INDIVIDUALLY

Fig. 159

INTERFACE BOX WIRING DIAGRAM
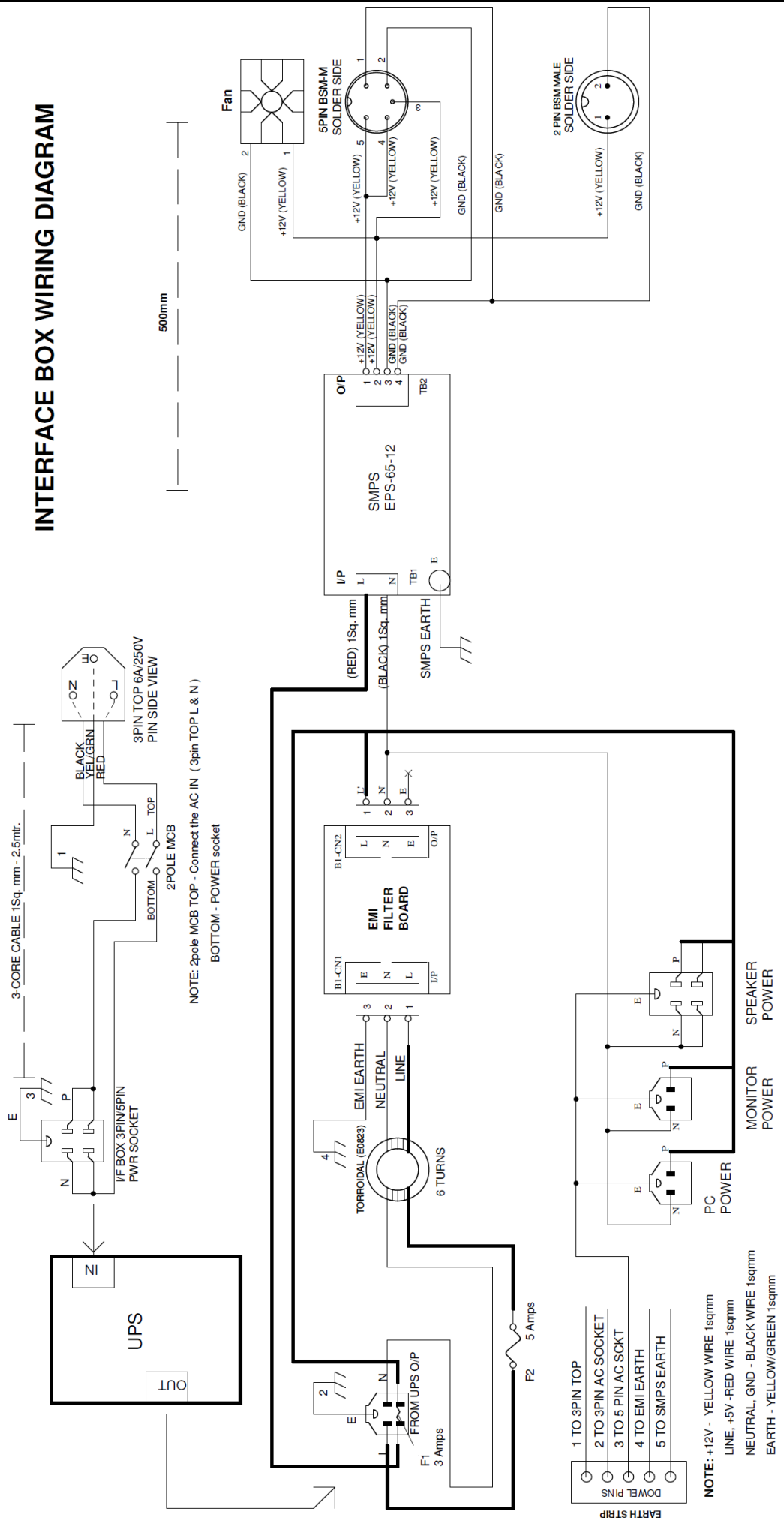
Fig. 160

11. TROUBLE SHOOTING

The common troubles and error messages which can be attended by the users are listed in the table given below.

For Troubles and Error messages other than that are listed in the table contact the Service Engineer for Trouble shooting.

☞	**The Service Engineer may ask for information to help in diagnosing the service concern. Conveying this information to the Service Engineer prior to servicing can help to expedite service to your equipment**

11.1. HARDWARE TROUBLE SHOOTING

EQUIPMENT

| Sl. No.	Error	Causes	Remedies
1	Caster reading not satisfactory	Brake pedal lock not applied before Caster swing	Apply Brake pedal lock before caster swing
		Target plate disturbed during alignment	After Runout, Target plates should not be leveled using Spirit level mounted on it
		Rotary plate movement struck-up	Ensure the free movement of Rotary plate by lubricating it
		Improper calibration	Re-do the calibration with high accuracy
		Un-even level between Front & Rear floor/platform	Level the Floor/Platform
2	Camber reading not satisfactory	Beam not leveled properly	Level the Vertical column in both Y & Z axis
		Un-even floor/platform level	Level the Floor/Platform
		Wheel brackets not fixed properly with Wheel	Fix them properly
		Improper calibration	Re-do the calibration with high accuracy
		Excessive Runout	Perform Runout properly
3	Toe reading not satisfactory	Wheel brackets not fixed properly with Wheel	Fix them properly
		Jerk occurring during PPR Runout	Runout must be done in same level without any jerk
4	Toe Reading Fluctuation	Dust in the Target Plate	Clean the Target plate
		External light source falling directly on Target plates	Avoid light source falling directly on Target plates
5	Steering cross after alignment	Wheel brackets not fixed properly	Improper seating will affect toe & camber Please refer to the image shown below

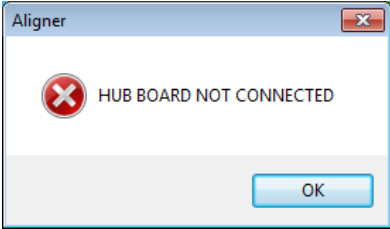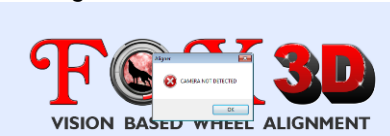| Sl. No.	Error	Causes	Remedies
	Jerk during Runout. Undulation in the platform		Correct it
		Defective wheel bracket	Replace the wheel bracket to confirm
		Calibration shaft is bent or distorted	Calibrate with proper kit
			On vehicle side, ➢ Make length of tie rods equal ➢ Check for worn out rear axle mountings ➢ Check tyre pressure ➢ If Vehicle aligned with Uneven tyre wear

DESKTOP COMPUTER & PERIPHERALS

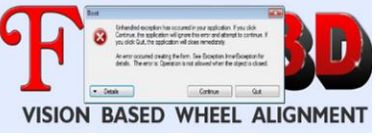| Sl. No.	Error	Causes	Remedies
1	When System is switched ON, no beep sound and No display	Power socket problem or loose connection in the Power socket plug point	Insert the equipment's Power cord to another Plug point's power socket & check it
	Still problem persists	UPS may be defective. i.e, No output from the UPS	Connect a Test lamp at the output socket of UPS and ensure whether UPS is OK. If not replace the UPS
		Loose connection in Fuse / Fuse may be blown off.	Check the status of Fuse and replace it
	All the external parameters have been checked. But the display problem remains as it is	ON/OFF Switch or Power supply board may be faulty	Get the problem solved through Service Engineer
2	When equipment is switched ON, only Audio sound is noticed. But no display in Monitor	Monitor may be switched OFF or Power supply to Monitor may got disconnected.	Switch ON the Monitor and Check the Power LED is ON. If not, replace the Power cord.
	Monitor Power LED blinking in Standby mode. But no display	Loose connection in the Monitor data cable	Switch OFF the system, remove the 15 Pin data cable and reconnect it to the system with correct polarity
	No loose connection in Data cable. Still the display problem persists	Monitor may be defective	Replace a monitor from other computer and check for it
		Computer's Internal system may be defective	Get the problem solved through Service Engineer
3	Electrical Shock observed in the system	No Earthing or loose contact in the Earthing point of switch board	Get the problem solved through Qualified personnel
		Earthing terminal in Power cord may have intermediate cut	Replace the Power cord

Sl. No.	Error	Causes	Remedies
4	Keyboard error message displayed when system is switched ON	Any keys in the Keyboard may be in pressed condition	Switch OFF the system and release the struck keys and again switch it ON
		Keyboard may be defective	Replace with any other type keyboard or get the problem solved by Service Engineer
5	Multimedia speaker not working	Input supply to speaker may be disconnected	Remove the plug point and re-fix it properly and ensure that the Green light in the Speaker is switched ON
			Replace defective Multimedia Speaker
6	Demo mode message displayed in Alignment screen	USB cable from the horizontal beam may be disconnected Camera is not detected	Re-connect it properly. USB port in Motherboard may be defective. Connect to other available USB port and check. USB cable may got damaged.

11.2. MECHANICAL TROUBLE SHOOTING

Sl. No.	Error	Causes	Remedies
1	Lift stops in between	Motor driving belts loose	Tighten the driving belt
2	Abnormal noise during operation	Insufficient lubrication	Check & apply lubricants as required
3	Abnormal noise in Belt	Slackness in belt	Ensure the tightness of belt and Grub screw in the Driven pulley

11.3. SOFTWARE TROUBLE SHOOTING

Sl. No.	Error	Causes	Remedies
1	Hub board not connected Aligner HUB BOARD NOT CONNECTED OK	Improper USB cable connection	Check the USB cable from PC to USB hub board
		Hub board & Camera not detected	Check Device manager in PC. If Hub board & Camera are not detected, check by replacing the USB cable
		PC USB port may be defective.	Check with other port
		No input to Hub board	Check 12V I/P to Hub board. If there is no input check the EMI & SMPS
		SMPS /EMI Filter failure	Replace with new SMPS/Board
		Hub board failure	Replace with new board
2	Camera disconnected while booting F3X 3D CAMERA NOT DETECTED OK VISION BASED WHEEL ALIGNMENT	Improper USB cable connection	Check the USB cable from Camera to USB hub board
		Camera driver not installed or not enabled in OS	Install the Camera driver / enable the Camera
		USB port of the PC may be faulty	Check with any other USB port or PC.
		Hub board board failure	Replace HUB board
		Camera failure	Replace with new camera assy

Sl. No.	Error	Causes	Remedies
3	Camera (either LH / RH) disconnected during operation	USB cable from Hub Board to Camera might have contact problem	If one of the devices is found disconnected in Device Manager, check for USB Cable. Interchange the USB cable to confirm. Or, replace the USB cable
		USB cable from PC to HUB board may be faulty	Check & replace
		Camera Driver File Corrupted	Go to "Device Manager" screen by selecting "Properties" from the right click options of "Computer" from Start menu. Check whether the driver is loaded. If ⚠ symbol is displayed, remove & re-fix USB cable. Driver will load automatically. Else, reinstall Alignment SW
		Camera failure	Replace with new camera
4	'X' mark over the respective Target plate image / sides	Camera failure	Replace with new camera
		Target plate Line-Of-Sight obstructed	Remove the obstruction
		Input supply to IR LED board is <9VDC	Adjust the respective Trimpot in LED Driver & Hub board to set the required voltage (9VDC)
		Input supply to IR LED board is >9VDC	
		Target plate not clean	Clean the Target plate
		Direct Sun light falls on Camera or Target Plate	Avoid direct sunlight falling on Target plate
		Target plate physical damage	Replace the respective Target plate
5	Unhandled exception error	Calibration file may be corrupted due to improper shut down	Restore the following files from back up. a. Calib_3D_L.mdb b. Calib_3D_R.mdb c. Align_3d.mdb If problem still exists, re-install the Alignment SW
6	Camera file mismatch	Respective camera calibration files are not installed	Install Camera calibration files from the CD provided or contact the Manufacturer

11.4. MIS-ALIGNMENT TROUBLE SHOOTING

Sl. No.	Error	Causes	Remedies
1	Car pulling towards one side	Misaligned Rear axle (ie., unequal Rear Toe). Rear axle is not perpendicular to Geometric Centre Line	Check the Rear suspension for worn out control arm bushings or sagged springs
		Setback	Check the position of Front wheels are in line
		Improper Camber setting. Car pulls sideway with more positive Camber	Check for worn out ball joints or control arm bushings and sagged or broken springs
		Uneven tyre pressure. Car pulls sideway with low inflation	Check both tyres are with same pressure

SI. No.	Error	Causes	Remedies
		Mismatched tyre sizes. Steering pull due to mixing of Radial & Normal tyres and cross ply	Both Front tyres must be of same size, same design & should have approx. same amount of thread wear
		Incorrect Caster setting	Caster must be same on Front wheels Check for worn out Control arm worn strut rod bushings
		Dragging brakes and car pulls sideway	Check for corroded brake caliper piston and misadjusted emergency brake cable
		Power steering problem	Check for uneven Steering balance of Front wheels in jacked up condition and run the engine. The steering should not turn one side due to leak in Control valve. Steering effort should also be equal in both directions
		Steering problem with tyre	Check for faulty tyre construction
2	Car wanders	Loose steering parts	Inspect Tie rod ends, Idler arm and steering gear mountings
		Worn out steering gear	Adjust if possible. Else replace it
		Vehicle skids while applying brake	Check for worn out strut or Control arm bushings
		Loose Wheel bearings	Remove the loose bearing and inspect for damages. If so, replace it
3	Steering wheel not centered	Toe not adjusted equally	Make the length of Tie rods equal
		Misaligned Rear axle	Check the rear axle alignment, worn out Rear axle mountings, Sagging springs or collision damage
		Steering wheel not centered	If Toe is adjusted correctly and Rear axle alignment is within specifications, check that the Steering wheel has not been remounted off centre. Remove the wheel and centre it
4	Other symptoms	Tyre wear on outside shoulder due to excessive +ve Camber	Inflate the tyre to recommended pressure and adjust the Camber as per specifications
		Tyre wear on inside shoulder due to excessive –ve Camber	Inflate the tyre to recommended pressure and adjust the Camber as per specifications
		Tyre wear on both shoulders due to under inflated tyres	Check the tyre pressure is as per recommended specifications
		Saw tooth tyre wear due to too much of Toe-in or Toe-out	Adjust the Toe as per specifications
		Abnormal tyre wear due to loose Steering system, misaligned Front or Rear wheels, defective suspension system or car is overloaded	Correct the Steering system, align Front & Rear wheels and correct the suspension system. If necessary replace the parts
		Hard steering due to low or uneven Tyre pressure, more positive Caster or tight Steering system or defective Power steering	Check & inflate the tyre as per recommended pressure and adjust the Steering system or replace the Power steering
		Tyre squeal on turns due to wrong Toe Out on Turn angle from misaligned Tie rod, or bent Steering arm. Low or uneven tyre inflation	Align the Tie rod and adjust the Lock angle and check the tyre pressure
		Unstable at high Speed due to incorrect Front or Rear Toe or worn out steering components	Adjust the Toe or replace the worn out steering components