

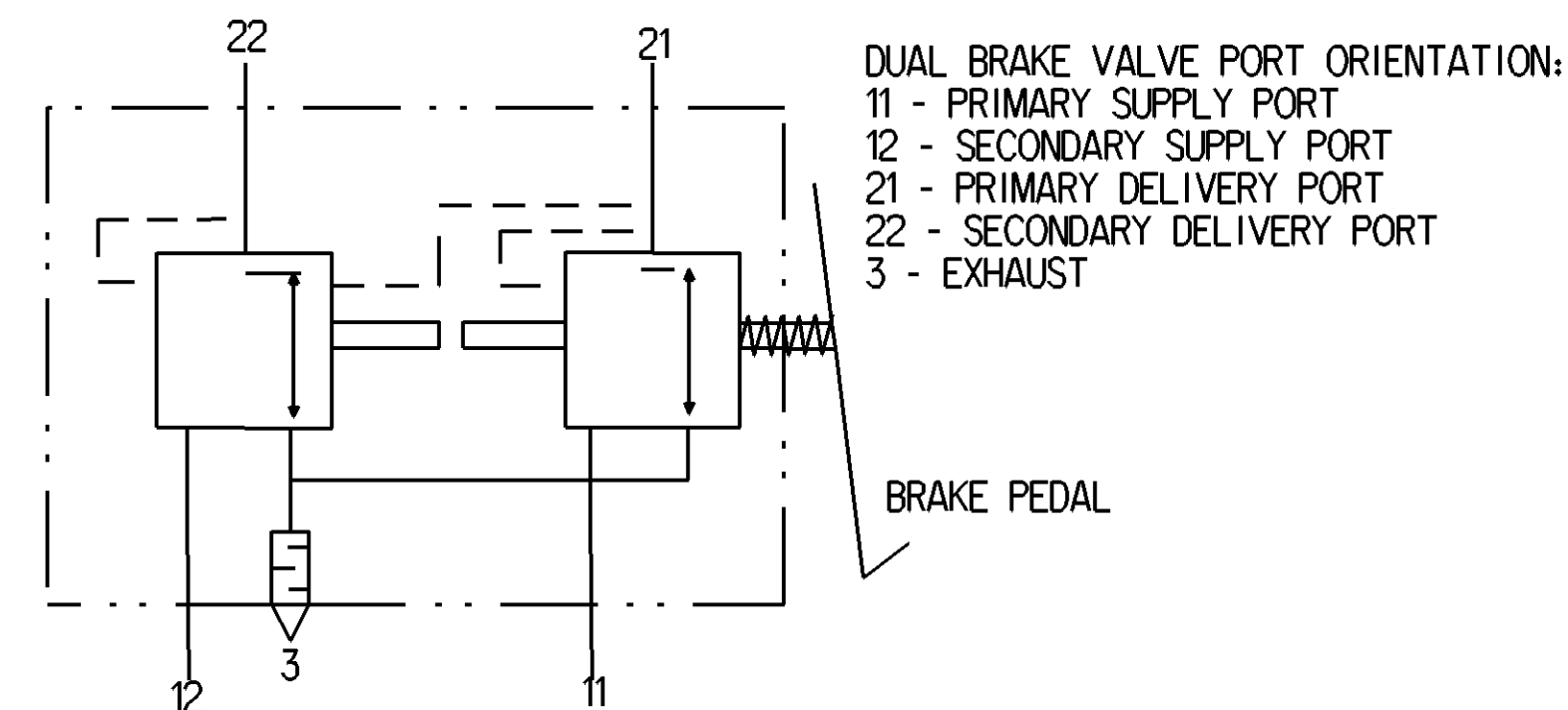
1> SAFETY CHARACTERISTICS	0
2> SIGNIFICANT CHARACTERISTICS	4
CI> CUSTOMER INTERFACE	2

WABCO PART NO. SHOWN HERE

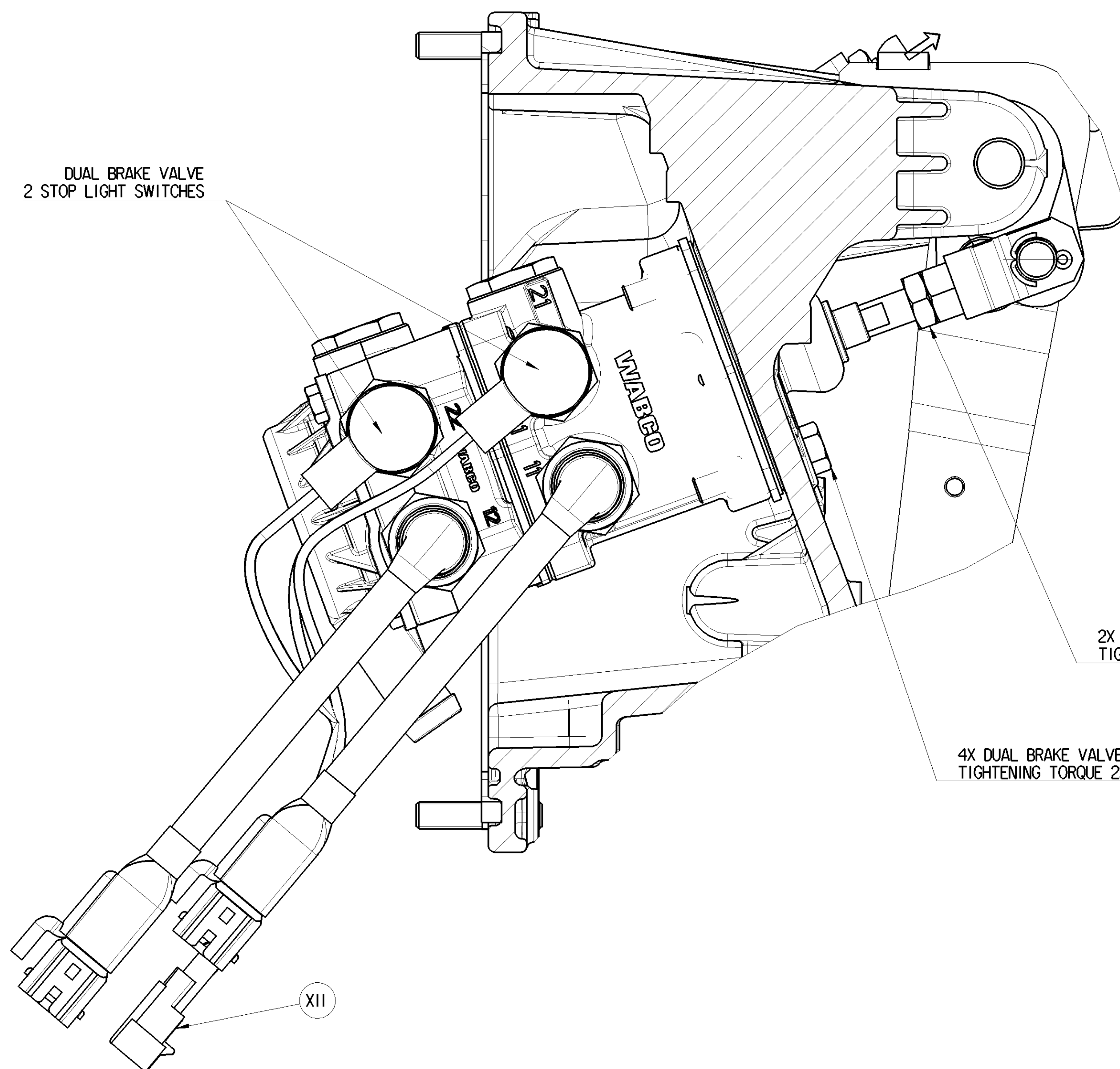
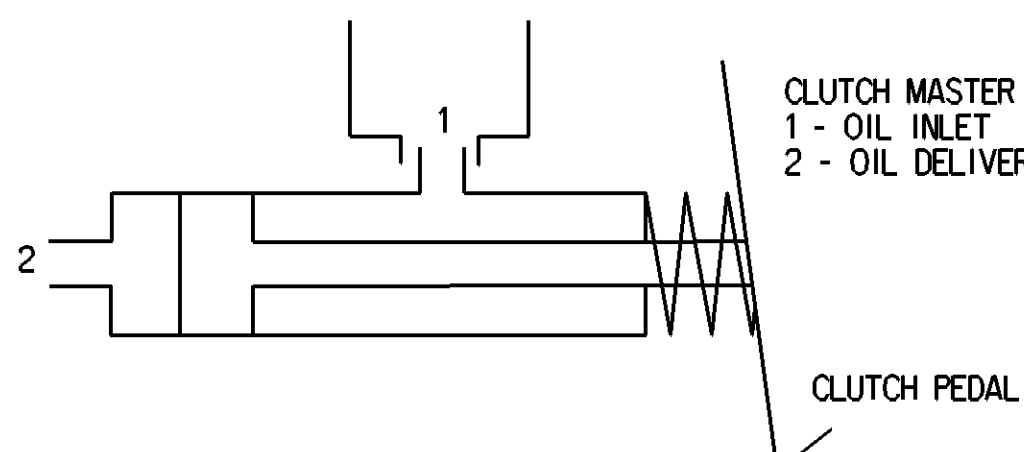


QR CODE FOR IDENTIFICATION
WABCO PART NO
BATCH NO (WEEK&YEAR OF MANUFACTURE)
PRI CODE
SERIAL CODE

NAME PLATE DETAILS
2:1

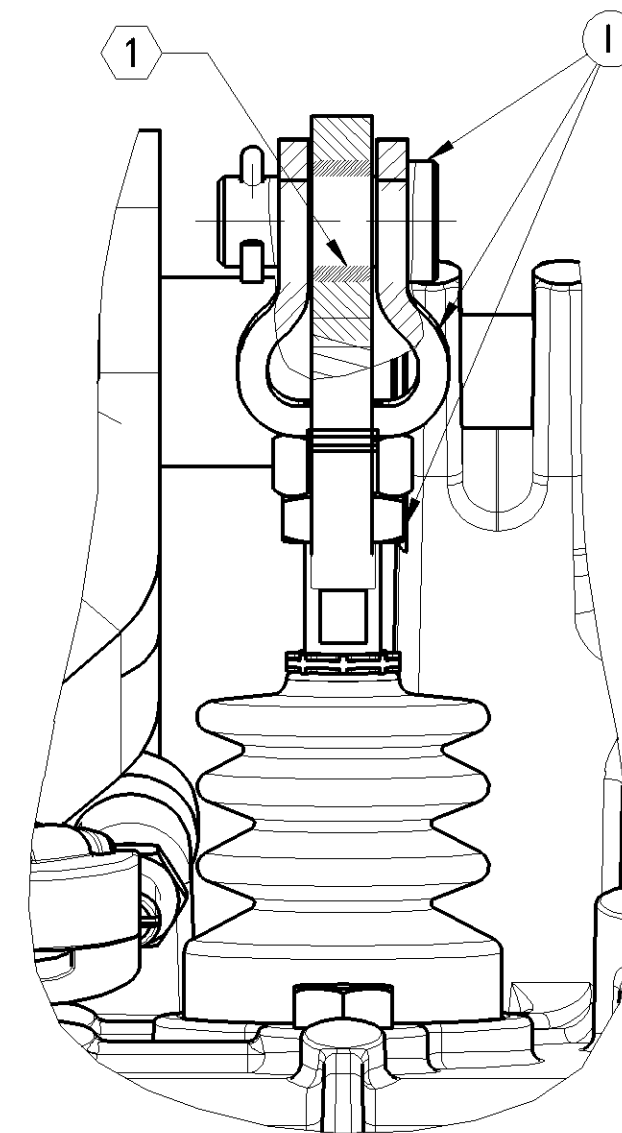


CLUTCH MASTER CYLINDER PORT DESCRIPTION:
- OIL INLET
- OIL DELIVERY

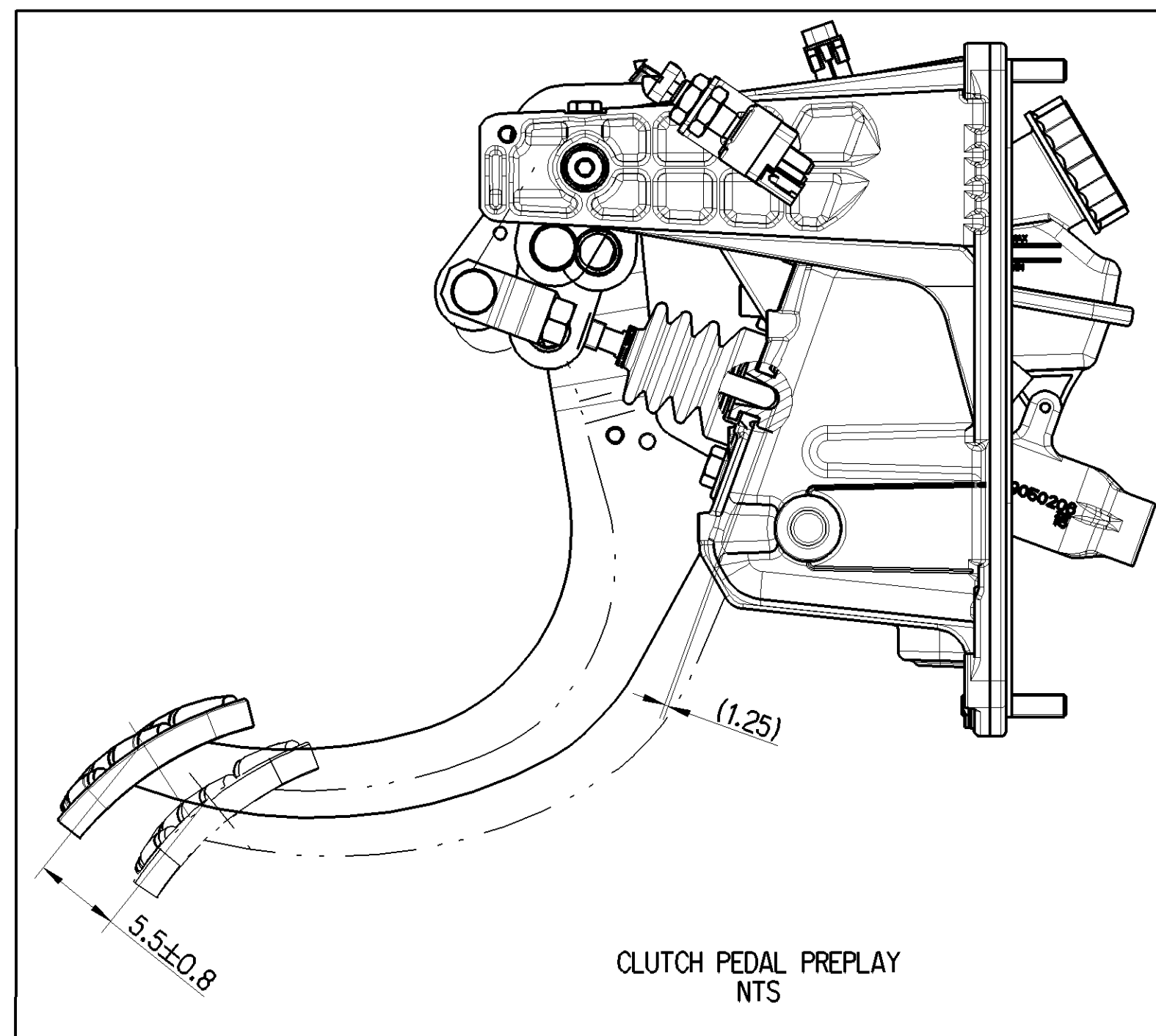
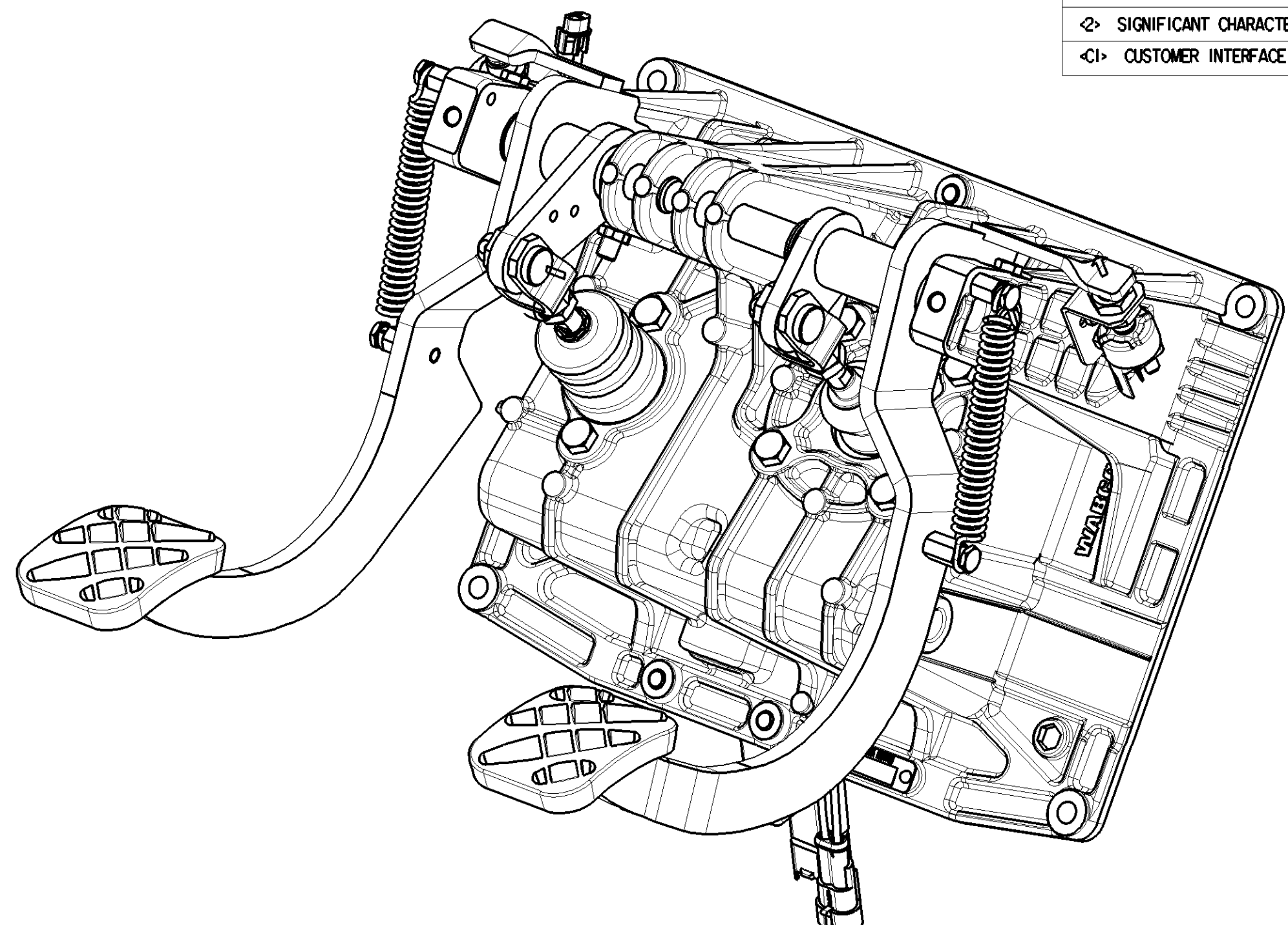


2X FORK HEXAGON NUTS (CLUTCH & BRAKE)
TIGHTENING TORQUE 17.5±2.5 Nm

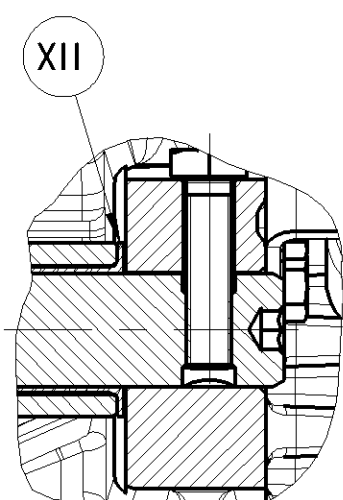
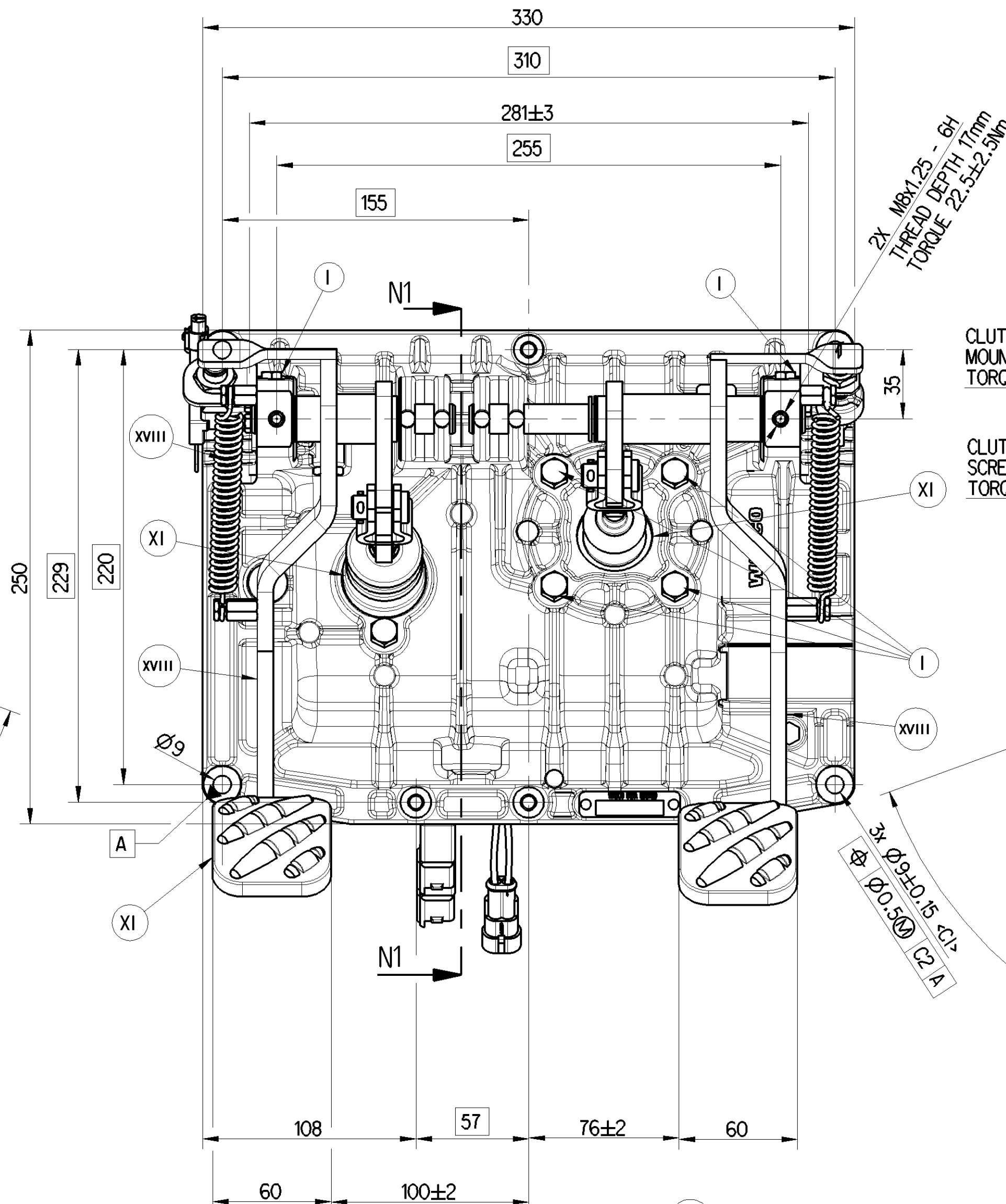
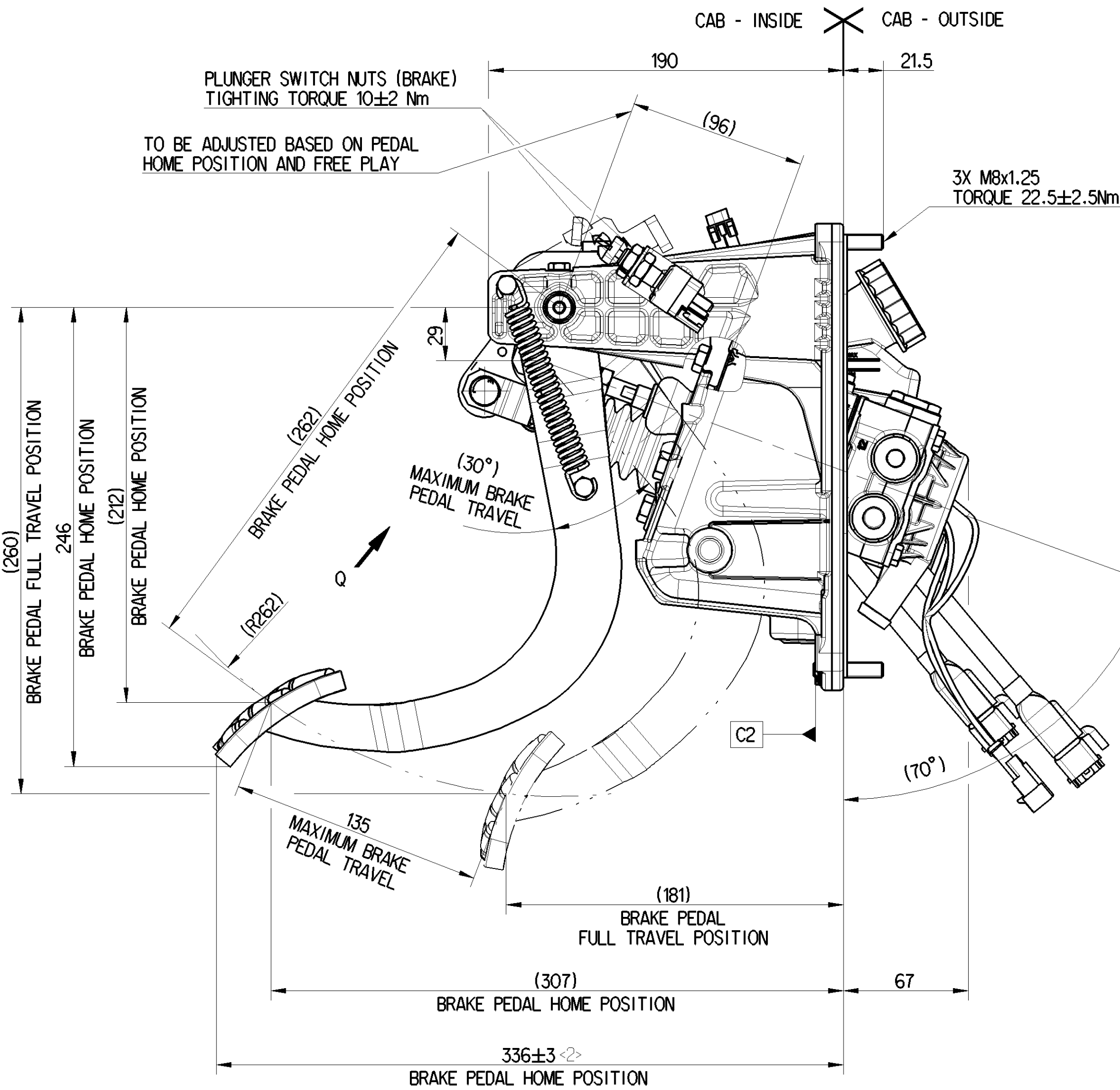
4X DUAL BRAKE VALVE HEXAGON BOLT
TIGHTENING TORQUE 22.5±2.5 Nm



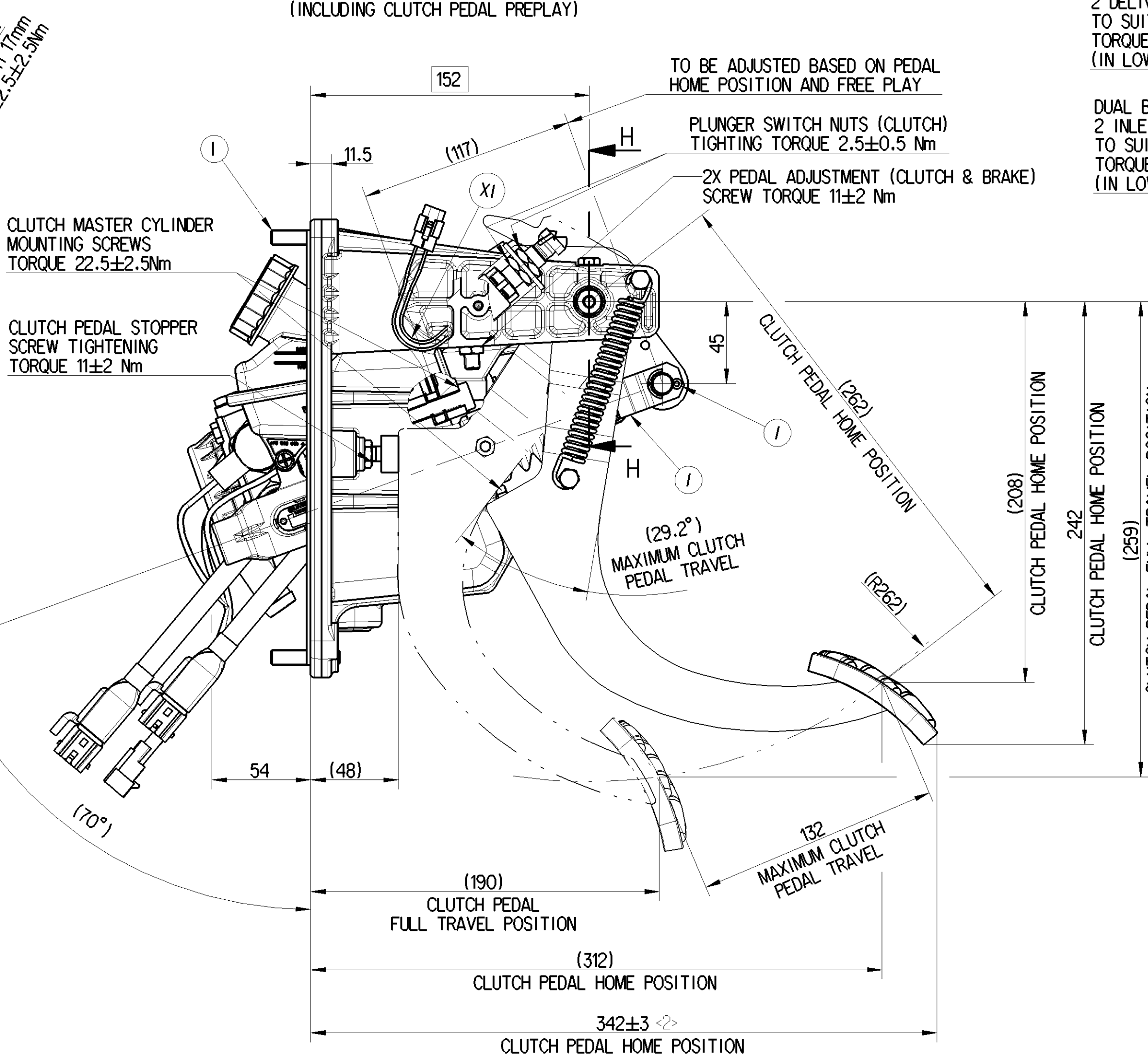
VIEW 0

CLUTCH PEDAL PREPLAY
NTS

TOTAL FREE PLAY OF BRAKE PEDAL IS 16 ± 5 mm

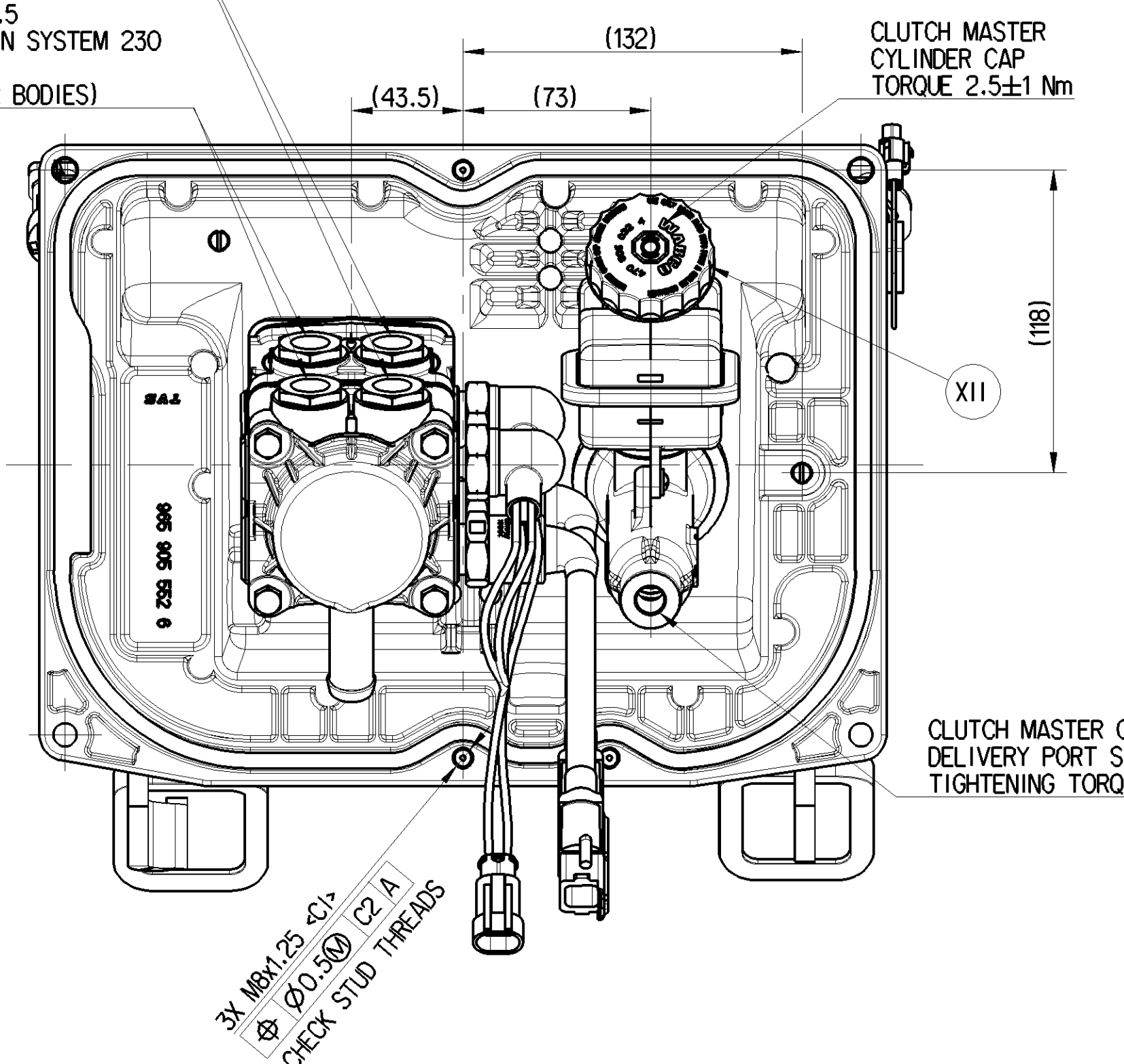

$$\begin{array}{c} \text{H}-\text{H} \\ 1:1 \end{array}$$

TOTAL FREE PLAY OF CLUTCH PEDAL IS 14 ± 4 mm 
(INCLUDING CLUTCH PEDAL PREPLAY)



DUAL BRAKE VALVE
2 DELIVERY PORTS M22x1.5
TO SUIT VOSS IN SYSTEM 230
TORQUE 10 ± 1 Nm
(IN LOWER AND UPPER BODIES)

DUAL BRAKE VALVE
2 INLET PORTS M22x1.5
TO SUIT VOSS PLUG IN SYSTEM 230
TORQUE 10±1 Nm
(IN LOWER AND UPPER BODIES)

TIGHTENING TORQUE 18.5 ± 2.5 Nm

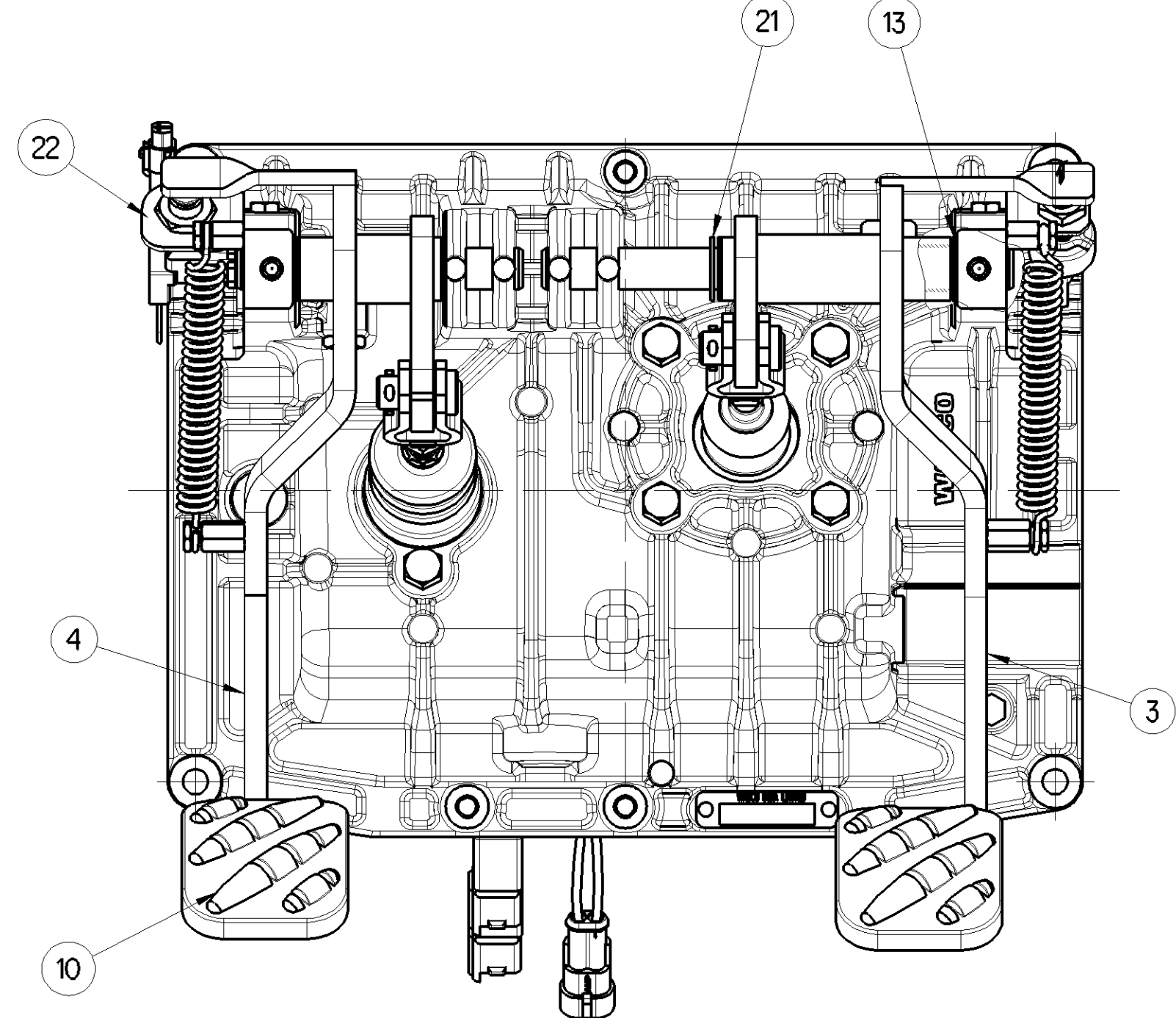
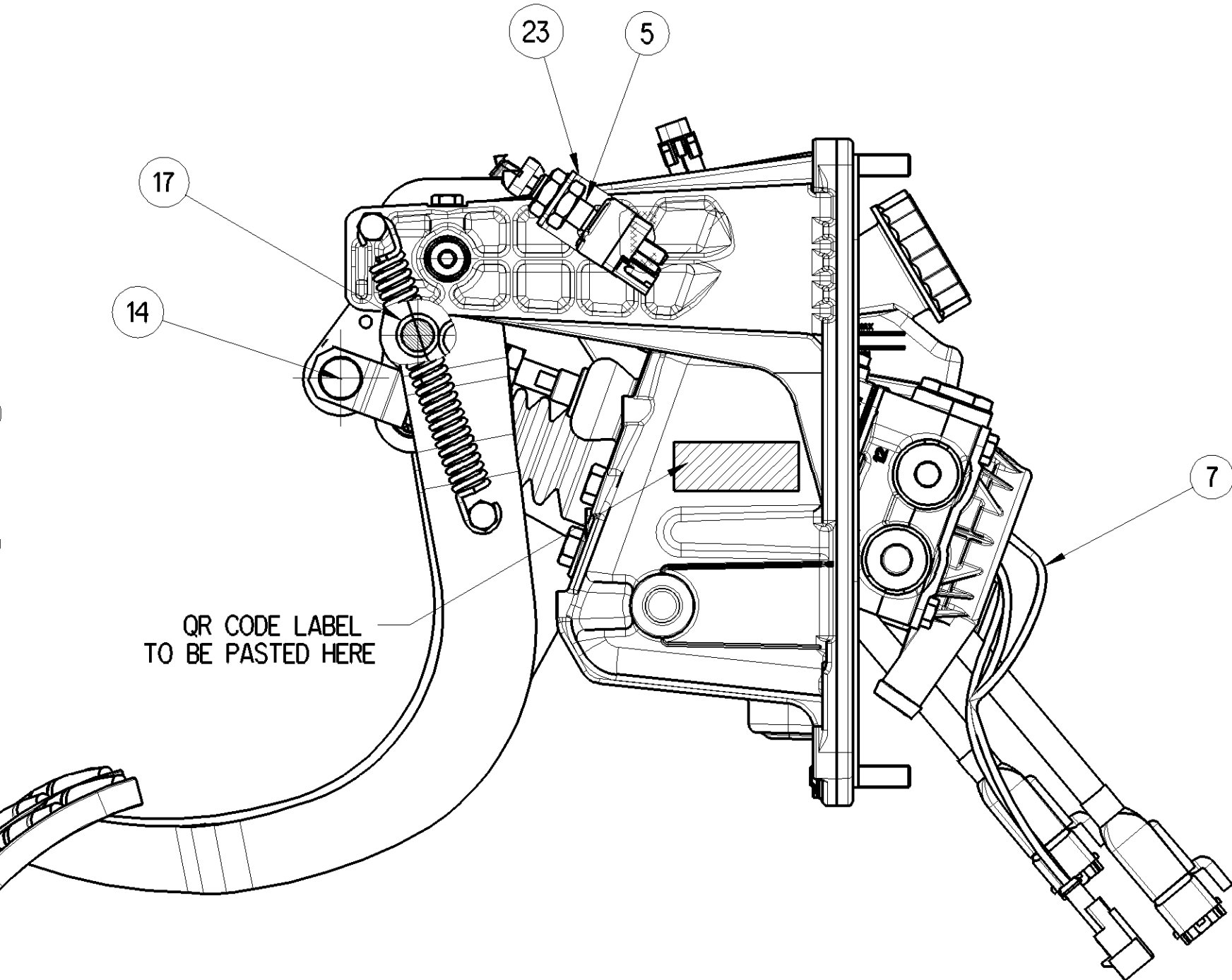
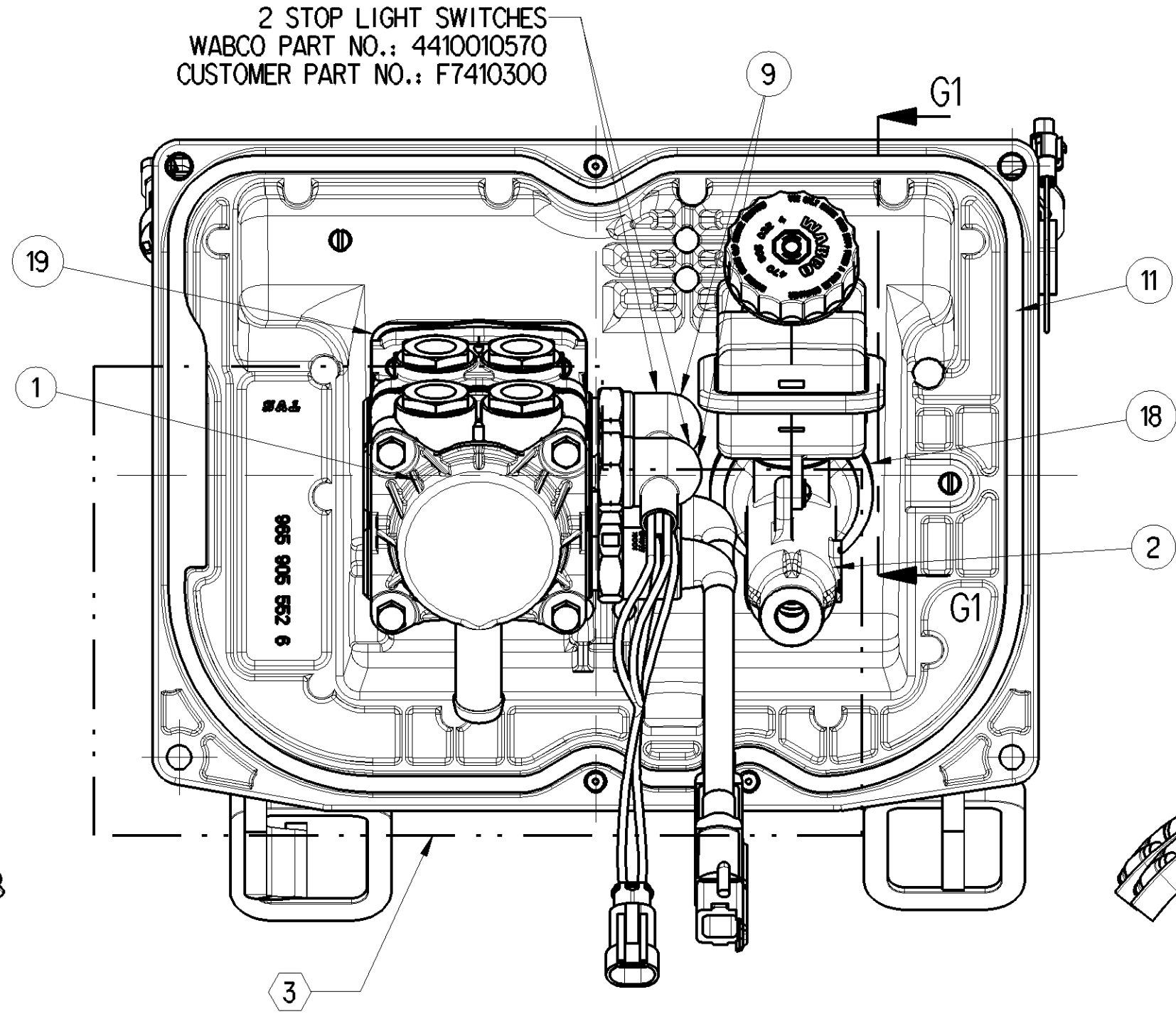
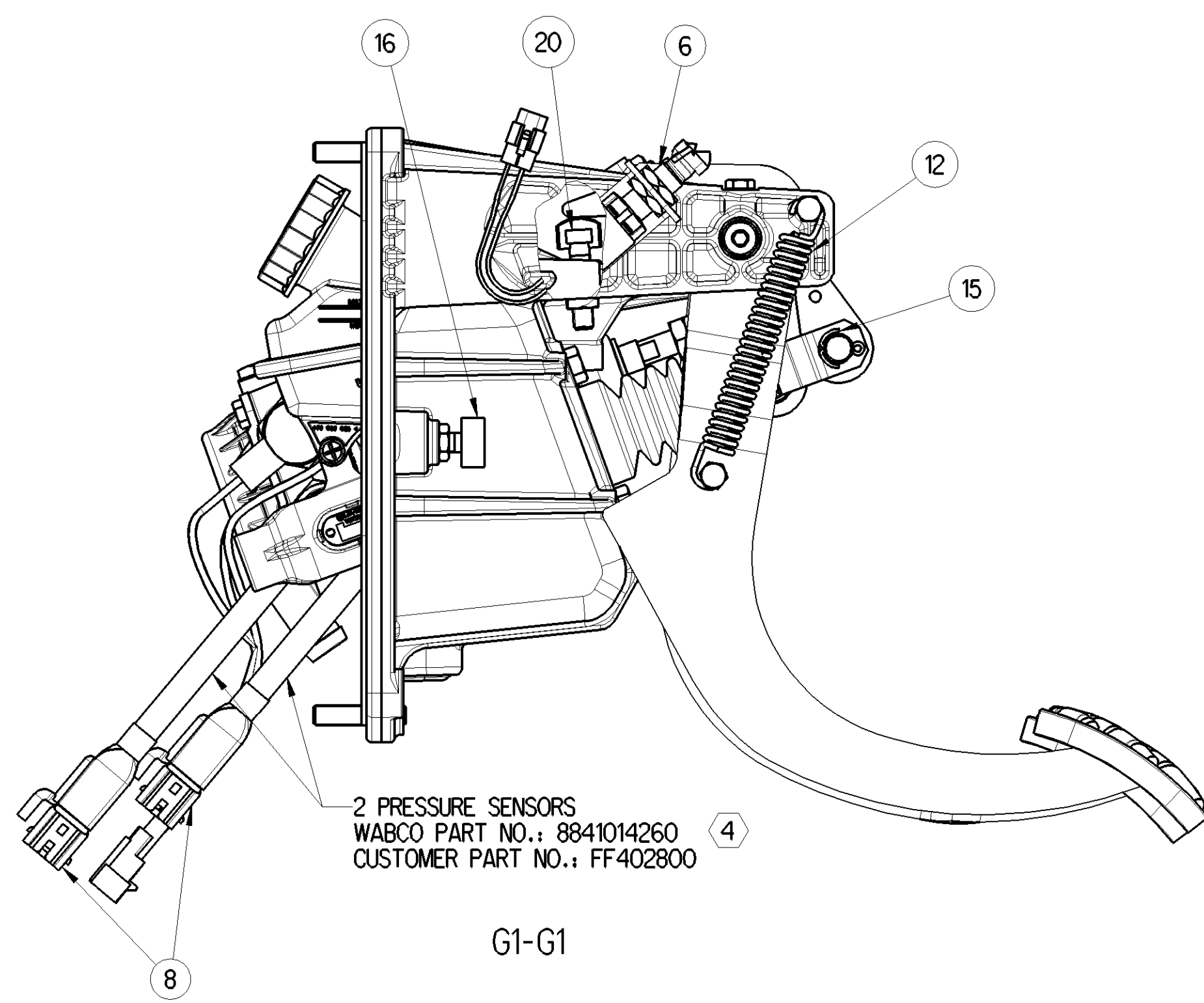
XVIII	STEEL	ED PAINT
XVII	STEEL	NO TREATMENT
XVI	CAST IRON	PLATED
XV	STEEL	ZINC IRON PLATED
XIV	CAST IRON	NO TREATMENT
XIII	ZINC ALLOY	ANODISED
XII	PLASTIC	NO TREATMENT
XI	RUBBER	NO TREATMENT
X	STAINLESS STEEL	NO TREATMENT
IX	BRASS	NO TREATMENT
VIII	ALUMINIUM	CHROMATED
VII	ALUMINIUM ALLOY	ANODISED
VI	ALUMINIUM ALLOY	CHROMATED
V	CAST IRON	PAINTED
IV	STEEL	POWDER COATED
III	STEEL	PAINTED
II	STEEL	PHOSPHATED
I	STEEL	ZINC PLATED
PART CODE	MATERIAL	SURFACE PROTECTION

① APPLY GREASE JED-294-1 OVER THE PART SURFACE DURING THE ASSEMBLY AT 2 PLACES (BRAKE AND CLUTCH PEDAL ASSEMBLY)

PEDAL	THICKNESS(mm)	PEDAL RATIO
BRAKE PEDAL	8	8.6
CLUTCH PEDAL	8	4.4

S NO	CUSTOMER PART NO
1	X6M02100

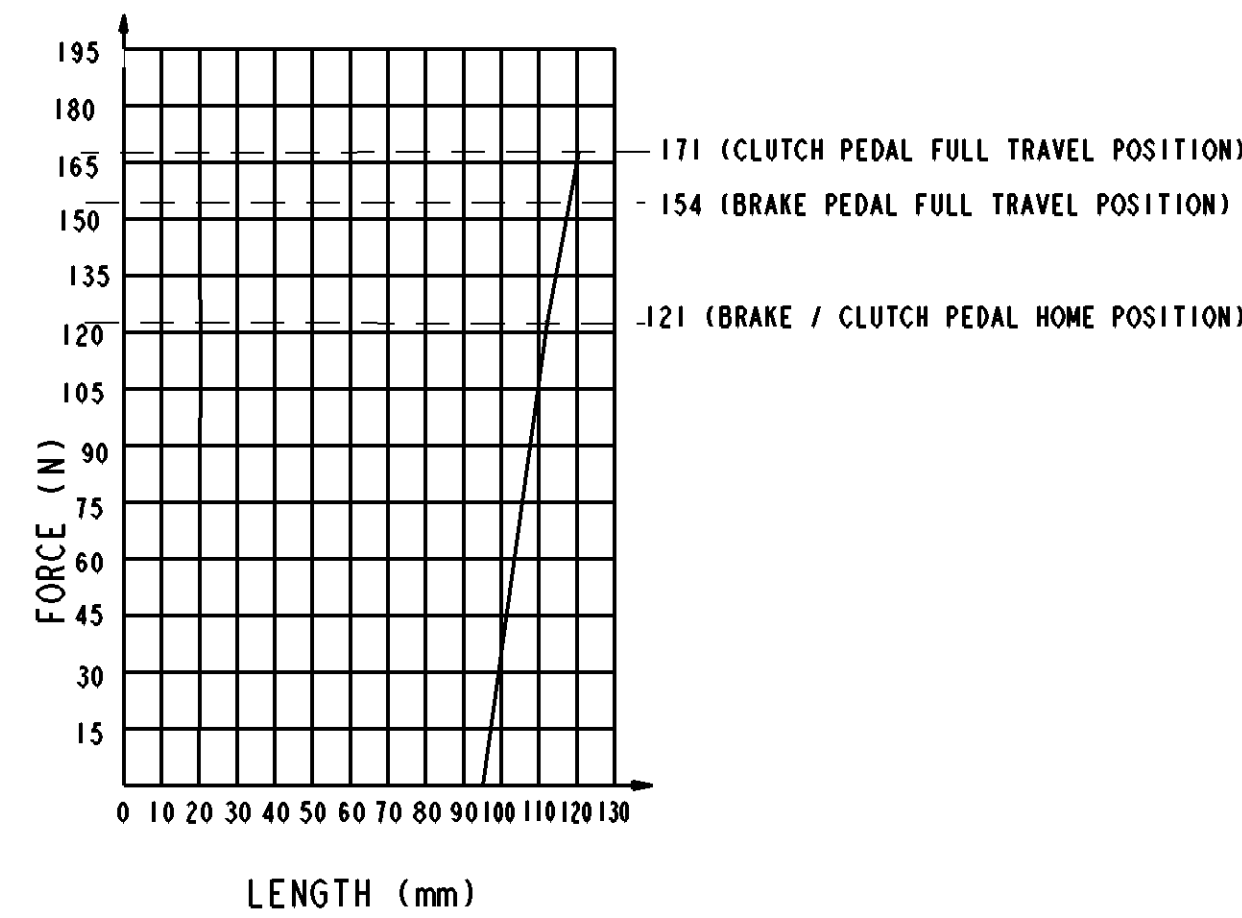
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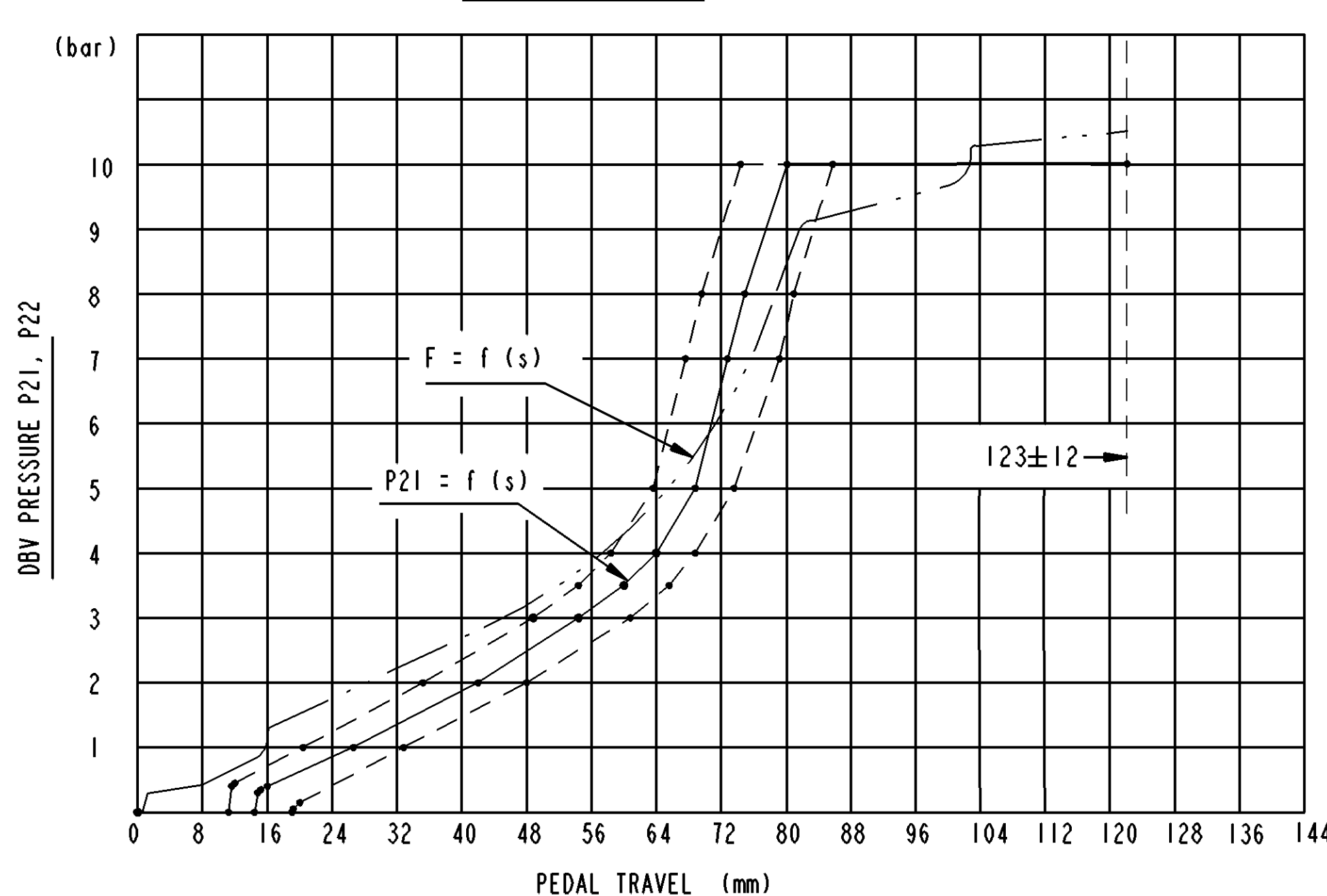
IPU-OVERHAULING HOUSING KIT MAJOR KIT				
Sl No.	DESCRIPTION	WABCO PART NUMBER	QTY.	AL PART NUMBER
1	DUAL BRAKE VALVE	4611001220	1	
2	MASTER CYLINDER	4700531330	1	
3	BRAKE PEDAL ASSEMBLY	9659137152	1	
4	CLUTCH PEDAL ASSEMBLY	9659050072	1	
5	BRAKE SWITCH	4410060140	1	
6	CLUTCH SWITCH	4410010542	1	
7	CONNECTOR ASSEMBLY	4477000282	1	

IPU-OVERALL HOUSING KIT MINOR KIT				
Sl No.	DESCRIPTION	WABCO PART NUMBER	QTY.	AL PART NUMBER
8	PRESSURE SENSORS	8841014260	2	
9	STOP LIGHT SWITCHES	4410010570	2	
10	PEDAL COVER	9650014764	2	
11	GASKET	9650011494	1	
12	SPRING	8960701574	2	
13	PLAIN BEARING	8997598654	4	
14	PIN	9659077194	2	
15	SPLIT PIN	810510004	2	
16	PEDAL STOPPER	9659050322	2	
17	BUSHING	9650011624	2	
18	GASKET	8840073224	2	
19	GASKET	9650011424	1	
20	PEDAL STOPPER	9659100012	1	
21	RETAINING WASHER	8100000124	1	
22	BRACKET	9659050284	1	
23	BRACKET	9659050294	1	
-	GREASE SACHET	M919910	1	

PEDAL RETURN SPRING CHARACTERISTICS



P11 = P12 = 10 bar

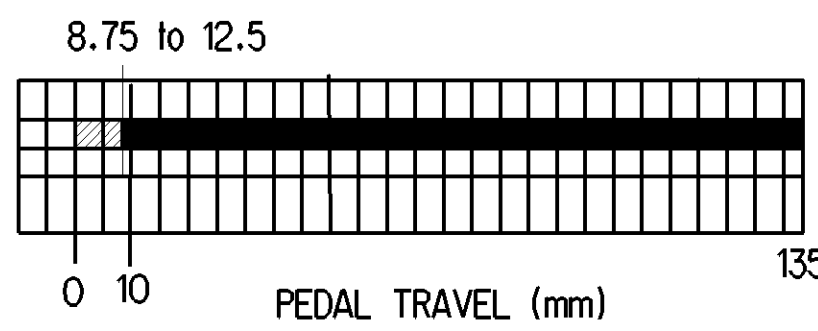


② BRAKE PEDAL PERFORMANCE CHARACTERISTICS
STOPPER PROVIDED WITHIN THE VALVE

CONSIDERING FOLLOWING CLUTCH DETAILS:-

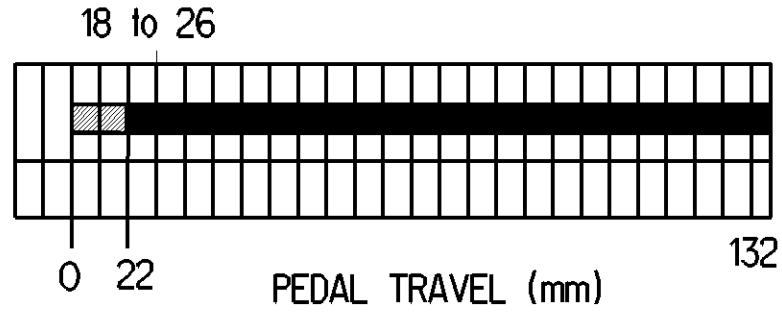
SL.NO	PARAMETERS	BOSS ICV	REMARKS
1	RELEASE LOAD AT CLUTCH BEARING - NEW CLUTCH	3200 N	
2	RELEASE LOAD AT CLUTCH BEARING - WORN CLUTCH	3700 N	
3	RELEASE STROKE AT CLUTCH BEARING Min.	10.0 mm	
4	RELEASE STROKE AT CLUTCH BEARING Max.	12.0 mm	
5	WEAR STROKE AT CLUTCH BEARING	17 mm	
6	CLUTCH FORK RATIO	2.125	
7	CLUTCH PEDAL TRAVEL	125 mm	
8	PEDAL RATIO	4.4	
9	MASTER CYLINDER BORE SIZE	Ø26.125 mm	

BRAKE SWITCH



■ CLOSED CONDITION
▨ OPEN CONDITION

CLUTCH SWITCH



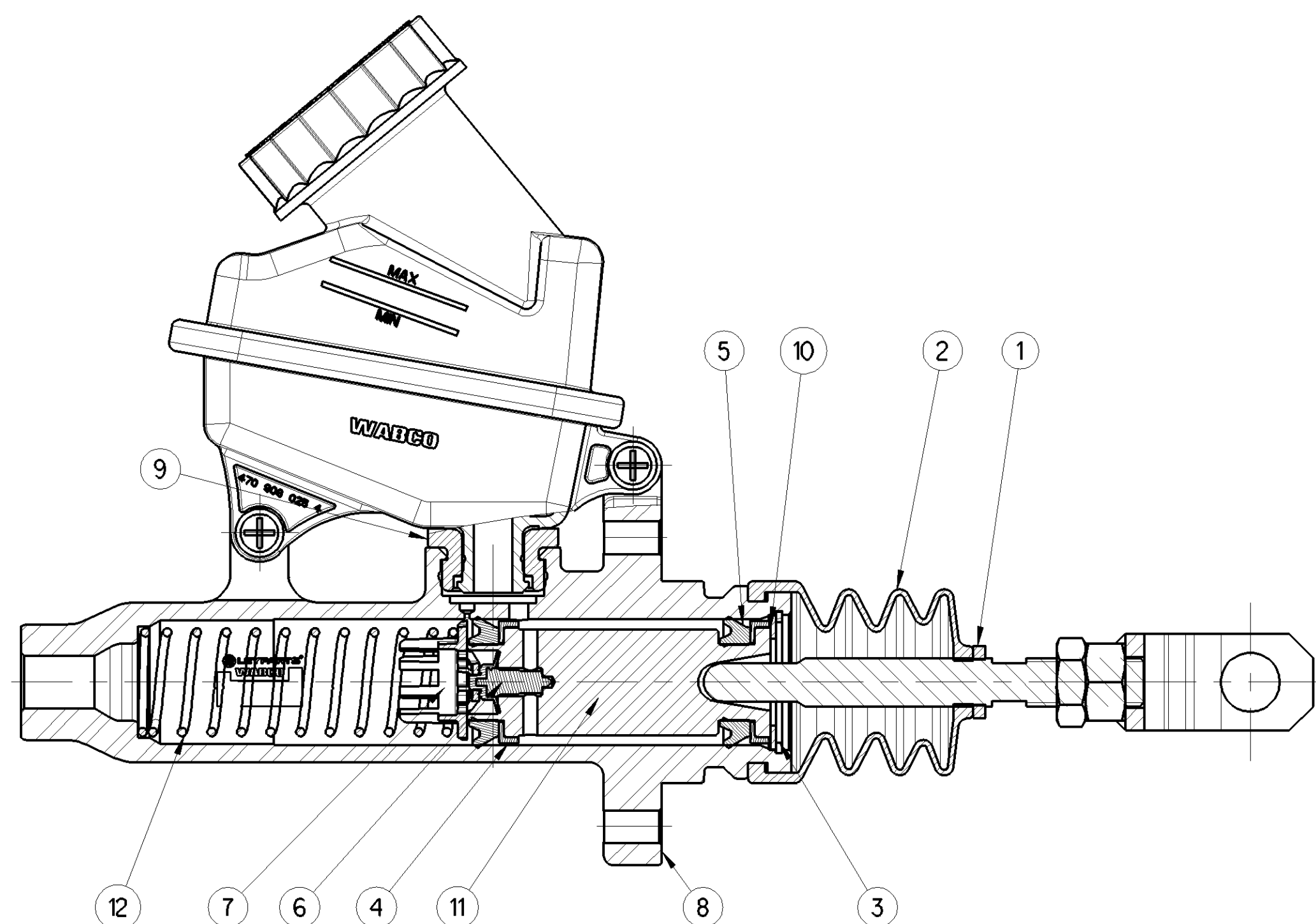
■ CLOSED CONDITION
▨ OPEN CONDITION

SL.NO	DESCRIPTION	CLUTCH SWITCH	BRAKE SWITCH	STOP LIGHT SWITCH
1	RATED CURRENT OF THE SWITCH	10 mA max.	2A max, RESISTIVE	10A, (6A RESISTIVE & 4A INDUCTIVE)
2	NOMINAL OPERATING VOLTAGE	12 V / 24 V DC	12 V / 24 V DC	12 V / 24 V DC
3	OPERATING VOLTAGE RANGE	8 TO 32 V DC	8 TO 32 V DC	8 TO 32 V DC
4	CONTACT CONFIGURATION	NORMALLY CLOSED	NORMALLY CLOSED	NORMALLY OPEN
5	CONTACT CLOSING PRESSURE (bar)	NA	NA	0.5 MAX
6	TERMINAL	Lucar Blades - 2 x (6 x 0.8)mm	Lucar Blades - 2 x (6 x 0.8)mm	4MM EYE LET
7	OPERATING TEMPERATURE	-40° C TO +85° C	-40° C TO +80° C	-40° C TO +85° C
8	CONTACT RESISTANCE BEFORE ENDURANCE	5 Ω	25 mΩ	10 mΩ
9	CONTACT RESISTANCE AFTER ENDURANCE	20 Ω	150 mΩ	60 mΩ
10	LIFE OF THE SWITCH (MEASURED IN CYCLES)	1x10 ⁶ CYCLES	2x10 ⁵ CYCLES	1x10 ⁶ CYCLES
11	IP LEVEL OF THE SWITCH	IP64, against dust and water	IP4, against dust	IP6K4, against dust and water (at inlet port sealed condition)
12	MATERIAL/PLATING SPECIFICATIONS OF THE TERMINALS	BRASS	BRASS, TIN PLATED	BRASS
13	PEDAL TRAVEL AT WHICH THE SWITCH CLOSE AND OPEN	CLUTCH PEDAL TRAVEL FOR CLUTCH SWITCH ACTUATION : (NO TO NC) : 18 - 26mm CLUTCH SWITCH TO CHANGE STATE FROM NO TO NC DURING PEDAL TRAVEL	BRAKE PEDAL TRAVEL FOR BRAKE SWITCH ACTUATION : (NO TO NC) : 8.75 - 12.5mm. BRAKE SWITCH TO CHANGE STATE FROM NO TO NC DURING PEDAL TRAVEL	NA
14	OPERATING FORCE	7 to 11N	15N MAX	NA
15	APPLICATIONS	1. ECU 2. INTERRUPT MODE FOR CRUISE CONTROL	EXHAUST BRAKE SIGNAL	1. STOP LIGHT SIGNAL
16	WIRE LENGTH	150mm	NIL	REFER SHEET 3/5
17	CONNECTOR	IPU END CONNECTOR : TYCO 174354-2. RECOMMENDED MATING CONNECTOR: TYCO-0-0174352	RECOMMENDED MATING CONNECTOR: BESMAK - 2FT 250 FHOL	END CONNECTOR PART NUMBER : 282104-1 / TYCO 3 CABLE TAG TO BE USED TO CLAMP WIRING HARNESS WITH CMC. THE CABLE TAG TO BE REMOVED BEFORE CONNECTING WIRING HARNESS AT CUSTOMER END. WIRING HARNESS ROUTING ONLY FOR REFERENCE. RECOMMENDED MATING CONNECTOR : 282080-1 / TYCO

SL.No.	IPU GENERAL NOTES	
1	PRODUCT FUNCTION AND RELIABILITY	
1.1	PRODUCT SPECIFICATION NUMBER	965 001 088 0
1.2	THERMAL RANGE OF APPLICATION	-40° C TO +80° C
1.3	WEIGHT	10.0kg (APPROXIMATELY)
1.4	MAXIMUM CLUTCH PEDAL FORCE WITHOUT AIR ASSISTANCE TO CLUTCH SERVO	620N
1.5	MAXIMUM BRAKE PEDAL FORCE TO GENERATE 2 BAR DELIVERY PRESSURE, AT DBV IS 130 N	
1.6	MAXIMUM CLUTCH PEDAL FORCE WITH 7 BAR AIR ASSISTANCE TO CLUTCH SERVO IS 155N	
1.7	SERVICE LIFE TO FIRST OVERHAUL IF FITTED AS PER RECOMMENDED LAYOUT 2 YEARS/ 2,00,000 Km WHICHEVER IS EARLIER FOR TRUCK AND INTERCITY BUS APPLICATION	
1.8	SALT SPRAY LIFE AS PER ASTM B117 (WITHOUT ACTUATION) :	300 HOURS FOR IPU ASSEMBLY EXCEPT EXTENSION SPRING CORROSION OF PARENT MATERIALS, WHICH ARE NOT DETRIMENTAL TO THE PRODUCT PERFORMANCE, IS ACCEPTABLE.
1.9	ALL OPEN PORTS AND FITTINGS ARE FITTED WITH CLOSURE PLUG AND CLOSURE SLEEVES RESPECTIVELY FOR STORAGE AND TRANSIT PURPOSE	

MAJOR KIT (CMC)

SL.NO.	DESCRIPTION	QTY	PART NO	AL PART NUMBER
1	BOOT RETAINER	1	4700530504	
2	GAITER	1	8977500084	
3	RETAINING RING	1	8105180184	
4	GUIDE RING	2	9700014104	
5	LIP SEAL	2	8971616274	
6	VALVE	1	4700535002	
7	SPRING GUIDE	1	4700531504	
8	GASKET	1	8840073224	
9	GASKET	1	4700531404	
10	WASHER	1	8951000044	
11	PISTON	1	4700536314	
12	COMPRESSION SPRING	1	8962600004	



DESCRIPTION	IPU END CONNECTOR DETAILS		
	CLUTCH SWITCH	BRAKE SWITCH	DBV
PIN DETAILS VIEW FROM TERMINAL SIDE			
TERMINAL DETAILS	1 - TERMINAL IN 2 - TERMINAL OUT	1 - TERMINAL IN 2 - TERMINAL OUT	TERMINAL 1 & 2 FOR STOP LIGHT SWITCH

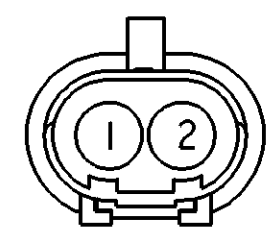
④ PRESSURE SENSOR SHOWN IN THE DRAWING IS FOR PICTORIAL REPRESENTATION ONLY. ACTUAL PART WILL VARY.

WABCO IS ONLY RESPONSIBLE FOR VOLTAGE VS PRESSURE CHECK AND JOINT LEAK CHECK OF PRESSURE SENSORS ON DBV ASSEMBLY. ANY LIABILITIES ON THE FAILURE OF THE PRESSURE SENSOR IS THE SOLE RESPONSIBILITY OF ASHOK LEYLAND.

General Specification: ISO 9076, JIS 534-1, Size ISO 14403 LP		Copyright ©		INTEGRAL PEDAL UNIT	
Further Technical Data:		Date: 2023-02-13		Sheet: 1 of 1	
Doc. Code: 965 001 088 0		To: KARTHIC		Revision: 1	
General Tolerances: JIS Z 0101		2023-02-13		Sipraanadivision	
Range of nominal dimensions in mm		Diameters in mm		Metric No.	
Class	11	± 50	± 80	± 100	± 120
Fine	± 0.05	± 0.1	± 0.15	± 0.2	± 0.25
Medium	± 0.1	± 0.2	± 0.3	± 0.4	± 0.5
Coarse	± 0.2	± 0.35	± 0.5	± 0.65	± 0.8
Size	1/2	3/4	1	1 1/2	2
Tap Holes acc. to	ISO 9001				
1) Tolerance Class Applied (overlapped)	A 0				
965 001 088 0		005 EN		2/5	

- NOTES:
- OPERATING VOLTAGE : 08-32 V DC
- OPERATING TEMPERATURE : -40 TO + 85°C
1. ALL DIMENSIONS ARE IN mm
 2. ALL DIMENSIONS ARE UPTO REAR END OF THE CONNECTOR AND CENTER OF THE EYE-LET TERMINAL UNLESS OTHERWISE SPECIFIED
 3. ALL CONNECTORS VIEW SHOWN FROM WIRE ENTRY SIDE UNLESS OTHERWISE SPECIFIED
 4. COT TUBE TO MEET FLAMMABILITY REQUIREMENT AS PER UL94.V-2
 5. PRINTED STICKER TO BE PROVIDED ON ALL END OF BRANCHES
 6. SPLICE JOINTS TO BE MADE BY ULTRASONIC JOINT CRIMPING AND COVERED WITH JELLY FILLED HEAT SHRINK SLEEVE
 7. CUSTOMER MATING CONNECTORS TO MEET THE MANUFACTURERS INTERFACE DIMENSIONS
 8. FOR CONNECTORS AND CONTACTS MANUFACTURERS PRODUCT SPECIFICATION IS VALID
 9. FULL BLACK PVC TAPING TO BE DONE OVER THE CORRUGATED TUBES COVERING FULL WIRING HARNESS AND SPACE TAPE TO BE DONE ON THE WIRE BUNDLE
 10. PRINTED STICKER INDICATING CUSTOMER PART NUMBER SHALL BE PROVIDED AS PER LOCATION SHOWN. CONTENTS OF THE LABEL AS PER DEVICE DOC.922
 11. ALL THE CABLES SHALL BE COVERED WITH FIRE RETARDANT SLIT TYPE CORRUGATED TUBES (PPFR) OF BLACK COLOR. CORRUGATED TUBES ARE SELECTED BASED ON BUNDLE DIAMETER / MANUFACTURING FEASIBILITY
 12. FOR INSTALLATION RESTRICTIONS PLEASE REFER 449 000 000 0 (DOC 011)
 13. SPLIT JOINTS / BRANCH NODES - BLACK COLOR COTTON INSULATION TAPES SHALL BE USED AT JOINTS
 14. ALL WIRES TO MEET ISO 6722:2006 (CLASS A) & FLAMMABILITY REQUIREMENTS TO MEET ISO 6722
 15. FURTHER TECHNICAL DATA AS PER THE PRODUCT SPECIFICATION 4477000272 (DOC 035)
 16. CUSTOMER CHOSEN CONNECTOR , ALL LIABILITIES AND CONSEQUENCES BELONGS TO CUSTOMER- ③

② 2 -POLE MALE CONNECTOR



CONNECTOR : 1.5 SUPERSEAL HOUSING 2M B
SUPPLIER : TYCO
SUPPLIER P/N : 282104-1

ADDITIONAL COMPONENTS			
S.NO	TYPE	SUPPLIER	SUPPLIER P/N
1	IDENTIFICATION LABEL	-	-

STOP LIGHT SWITCH-1.1
CONNECTOR : RING TRML Ø4 (0.5-1.5)
SUPPLIER : TT
SUPPLIER P/N : TT-1841(TC)

RED COLOUR BOOT

STOP LIGHT SWITCH-1.2
CONNECTOR : RING TRML Ø4 (0.5-1.5)
SUPPLIER : TT
SUPPLIER P/N : TT-1841(TC)

BLACK COTTON TAPE

IDENTIFICATION STICKER

COTTON BLACK TAPE

SP01			
DIRECTION	WIRE NO.	COL.	CSA
L	WIRE1	R/Y	0.5
R	WIRE2	R/Y	0.5
R	WIRE3	R/Y	0.5

SP02			
DIRECTION	WIRE NO.	COL.	CSA
L	WIRE4	R/W	1
L	WIRE5	R/W	1
R	WIRE6	R/W	1

STOP LIGHT SWITCH-2.2
CONNECTOR : RING TRML Ø4 (0.5-1.5)
SUPPLIER : TT
SUPPLIER P/N : TT-1841(TC)

STOP LIGHT SWITCH-2.1
CONNECTOR : RING TRML Ø4 (0.5-1.5)
SUPPLIER : TT
SUPPLIER P/N : TT-1841(TC)

VEHICLE MODEL	CUSTOMER OFFER PART NO.	CUSTOMER ALLOTTED WABCO PART NO.
-	-	-

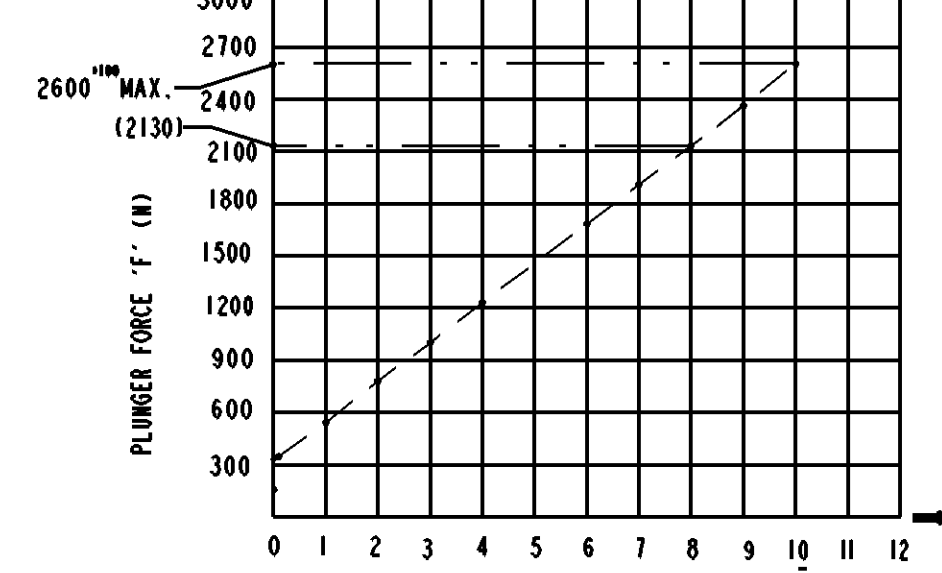
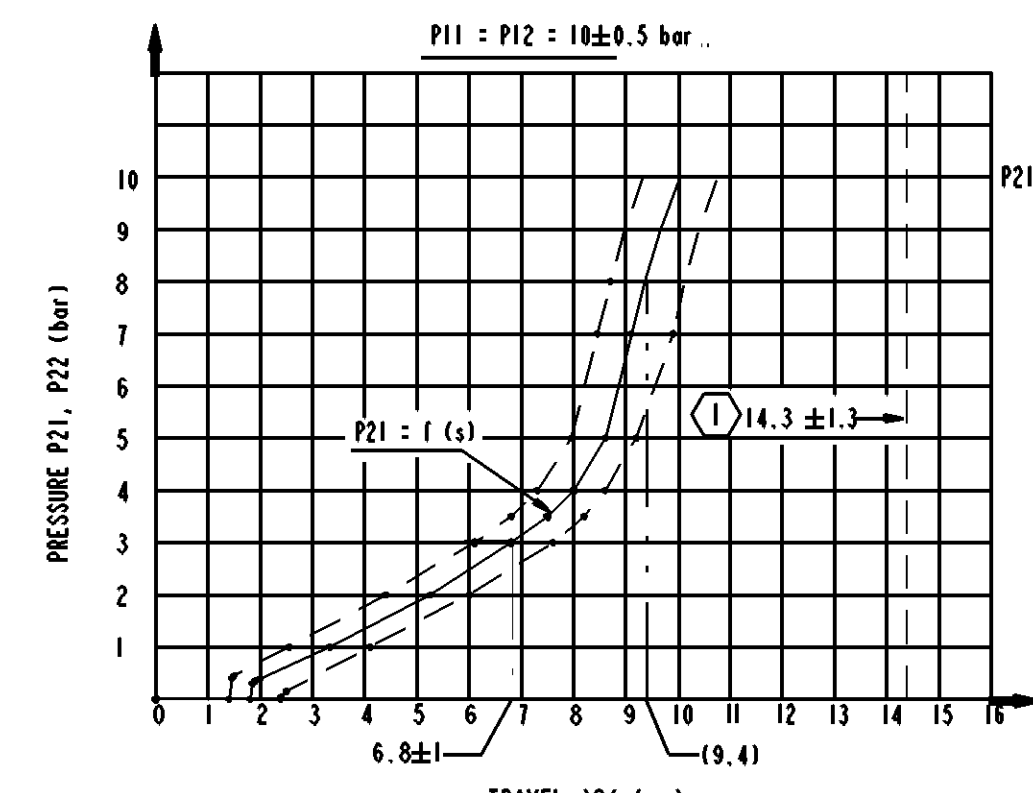
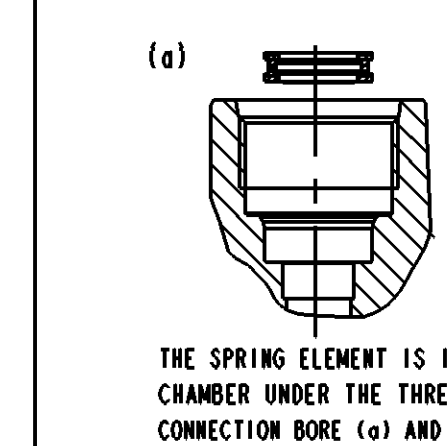
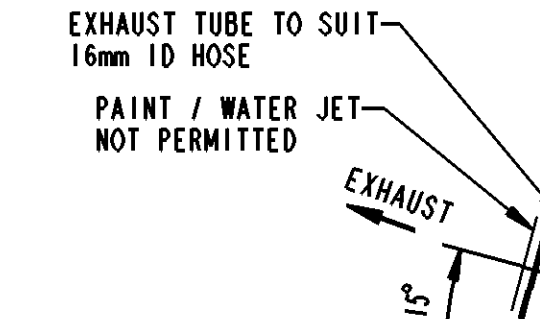
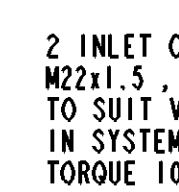
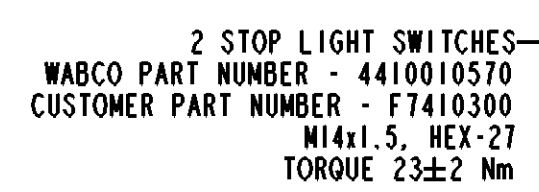
SYMBOL	SYMBOL DESCRIPTION
	SPACE TAPE
	SPIRAL / ROUGH TAPE
	FULL / OVERLAP TAPE
	POINT / SPOT TAPE
	JUNCTION COTTON TAPE
	COT TUBE
	SPLICE
	WIRE BUNDLE
	JUNCTION PVC TAPE
	BRAID TUBE
	PVC TUBE

BRANCH TOLERANCES	
UPTO 500	+30/-0
UPTO 2000	+50/-0
UPTO 5000	+60/-0
ABOVE 5000	+75/-0

COLOR CODE	COLOR DESCRIPTION
B	BLACK
BR	BROWN
G	GREEN
GR	GREY
L	BLUE
LG	LIGHT GREEN
O	ORANGE
P	PINK
R	RED
SB	SKY BLUE
V	VIOLET
W	WHITE
Y	YELLOW
N	NATURAL

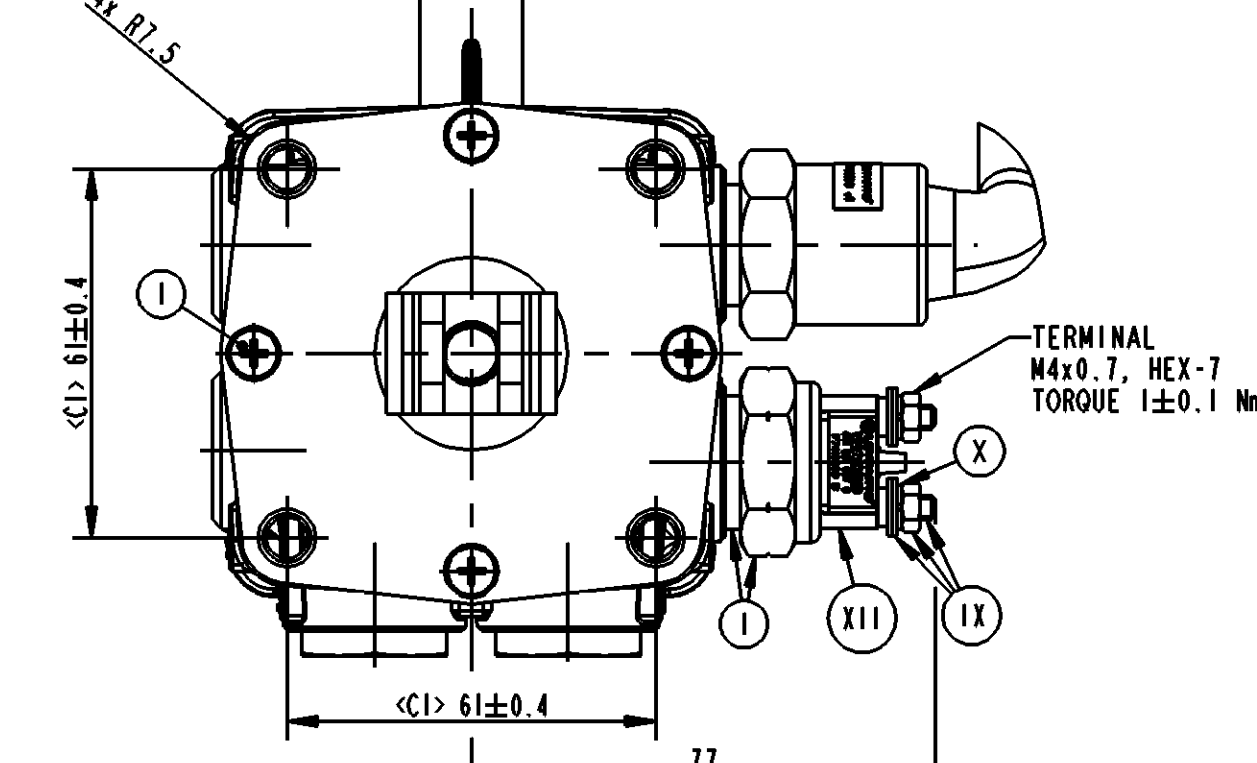
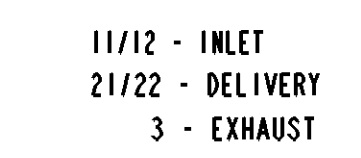
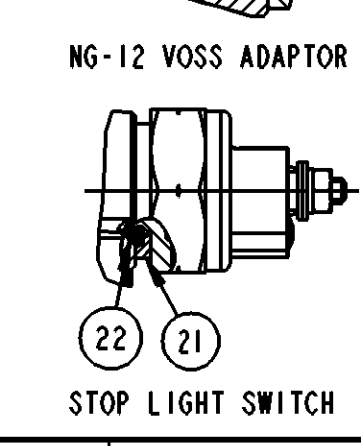
General Specification: IEC 60321-1, Size ISO 14400 LP	
Further Technical Data: 447 700 027 2	Doc. Code: 035
General Tolerances: IEC 60321-1	Doc. Code: 035
Range of Nominal Dimensions (L & W)	Doc. Code: 035
Class II	± 0.10
Class III	± 0.15
Class IV	± 0.20
Class V	± 0.25
Class VI	± 0.30
Class VII	± 0.35
Class VIII	± 0.40
Class IX	± 0.45
Class X	± 0.50
Class XI	± 0.55
Class XII	± 0.60
Class XIII	± 0.65
Class XIV	± 0.70
Class XV	± 0.75
Class XVI	± 0.80
Class XVII	± 0.85
Class XVIII	± 0.90
Class XIX	± 0.95
Class XX	± 1.00
Class XXI	± 1.05
Class XXII	± 1.10
Class XXIII	± 1.15
Class XXIV	± 1.20
Class XXV	± 1.25
Class XXVI	± 1.30
Class XXVII	± 1.35
Class XXVIII	± 1.40
Class XXIX	± 1.45
Class XXX	± 1.50

CIRCUIT TABLE					
S.NO	WIRE NO.	WIRE TYPE	CSA	COL.	FROM(A) TO(B)
1	WIRE1	ISO 6722 CLASS BIFLRY-B) 0.5 R/Y	2	-POLE MALE CONNECTOR	1 SP01
2	WIRE2	ISO 6722 CLASS BIFLRY-B) 0.5 R/Y	2	-POLE MALE CONNECTOR	1 SP01
3	WIRE3	ISO 6722 CLASS BIFLRY-B) 0.5 R/Y	2	-POLE MALE CONNECTOR	1 SP01
4	WIRE4	ISO 6722 CLASS BIFLRY-B) 1 R/W	2	-POLE MALE CONNECTOR	2 SP02
5	WIRE5	ISO 6722 CLASS BIFLRY-B) 1 R/W	2	-POLE MALE CONNECTOR	2 SP02
6	WIRE6	ISO 6722 CLASS BIFLRY-B) 1 R/W	2	-POLE MALE CONNECTOR	2 SP02

1

1	PRODUCT FUNCTION AND RELIABILITY	
1.1	WORKING MEDIUM	AIR
1.2	NORMAL WORKING PRESSURE	10 bar
1.3	MAXIMUM OPERATING PRESSURE (TEMPORARILY)	13 bar
1.4	EQUIVALENT FLOW DIAMETER	10 mm
1.5	TEMPERAL RANGE OF APPLICATION	- 40° C to +80° C
1.6	INSTALLATION POSITION	OPTIONAL
1.7	CORROSION RESISTANCE	300 HOURS OF NSS.
	QUALITY COMPLIANCE PLAN TESTS ARE CONDUCTED REGULARLY AS PER CLAUSE No. 06 OF PS 4010011	
	SERVICE LIFE TO FIRST OVERHAUL	
	2 YEARS / 180000 KM WHICHEVER IS EARLIER FOR AIR DRYER OR NON DUM	
3	1 YEAR/80000 KM WHICHEVER IS EARLIER FOR NON AIR DRYER OR NON DUM FITTED VEHICLE	
	OPEN PORTS/MALE THREADS ARE FITTED WITH CLOSURE PLUGS FOR STORAGE AND TRAVEL PURPOSES	
	PRESSURE SENSOR SHOWN IN THE DRAWING IS FOR PICTORIAL REPRESENTATION ONLY. ACTUAL PART WILL VARY.	
5	MARCOC IS ONLY RESPONSIBLE FOR VOLTAGE VS PRESSURE CHECK AND JOINT LEAK CHECK OF PRESSURE SENSORS ONLY ASSEMBLY. THE ABILITY TO PREVENT THE FAILURE OF THE PRESSURE SENSOR IS THE	

S. No.	CUSTOMER PART NO.	WIN PART NO.	DESCRIPTION	QTY
1		461106594	ROOT	1
2		3630180	SPRING SEAT	1
3		8979801304	SEALING RING	2
4		4610111	VALVE	2
5		3632780	SPRING	2
6		8978060424	SEALING RING	2
7		8979802154	SEALING RING	2
8		8979871104	SEALING RING	1
9		8979802504	SEALING RING	2
10		8979801344	SEALING RING	1
11		8979801104	SEALING RING	1
12		3632770	FILTER	2
13		3630170	RUBBER SPRING	1
14		3630220	GUIDE RING	2
15		461101404	GASKET	1
		3919910	GREASE SACKET	2
REPAIR KIT 300003124 (MSP 31/24) CONSISTS OF 17 ITEMS SHOWN				
S. No.	CUSTOMER PART NO.	WIN PART NO.	DESCRIPTION	QTY
1		8979803224	O-RING	1
17		995370044	SPRING ELEMENT	1
18		995226674	RETAINING CLIP	1
19		8979801464	O-RING	1
20		8979801534	O-RING	1
REPAIR KIT REQUIRED IS MAXIMUM 4 QTY.				
THE FOLLOWING ARE INDIVIDUAL SERVICEABLE PARTS ①				
S. No.	CUSTOMER PART NO.	WIN PART NO.	DESCRIPTION	QTY
21		8958001814	WASHER	2



PRODUCT / DETAILS	S.L.SWITCH
CONTACT CLOSING PRESSURE (bar)	0.5 MAX
PS	4410010570_03

<1> SAFETY CHARACTERISTICS	
<2> SIGNIFICANT CHARACTERISTICS	
<1> CUSTOMER INTERFACE	

[illegible][illegible]