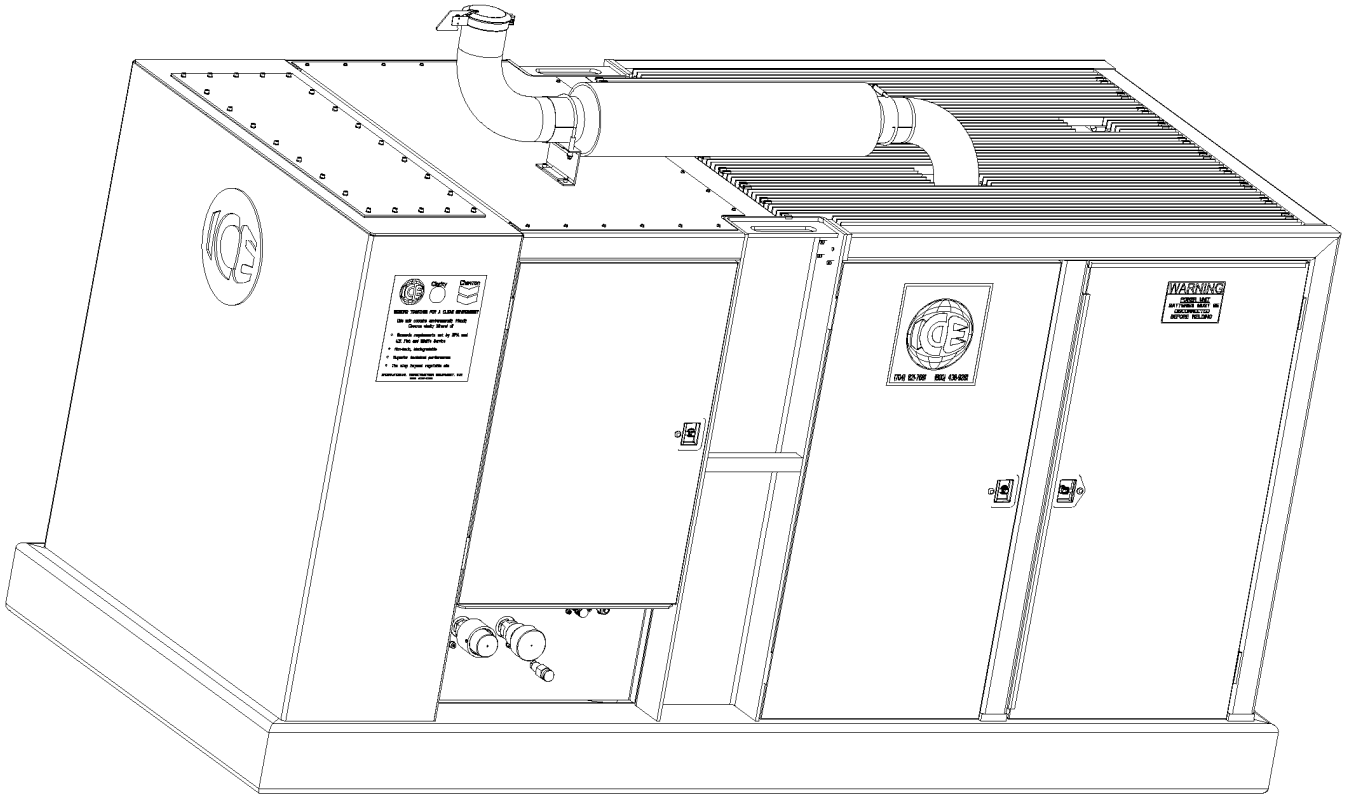
PARTS MANUAL

ICE MODEL 595G POWER UNIT



This Manual is for Serial Numbers P75501 and up

INTERNATIONAL CONSTRUCTION EQUIPMENT, INC.

Specializing in Pile Driving and Drilling Equipment

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INTRODUCTION

Literature

This manual contains parts information for your ICE equipment. This manual should be stored in or near the power unit in a literature holder or literature storage area. Read, study and keep it with the equipment literature, ICE Operating and Maintenance Manual and CAT engine information. English is the primary language for the ICE publications. The English used facilities translation and consistency in electronic media delivery. Some photographs or illustrations in this manual show details or attachments that may be different from your equipment. Guards and covers may have been removed for illustrative purposes. Continuing improvement and advancement of product design may have caused changes to your equipment which are not included in this manual. Whenever a question arises regarding your equipment or this manual, please consult ICE or your ICE distributor for the latest available information.

Description, General Parts Information, Ordering Parts, Parts Lists

These sections provide information and guidance for ordering replacement parts from ICE.
In order to receive correct parts, please be prepared to provide equipment serial numbers to ICE.
The electrical and hydraulic components and circuitry information may be used with the Trouble-

Hydraulic Circuitry and Electric Circuitry

shooting section in the Operating and Maintenance Manual to resolve difficulties with the operation of the equipment. If difficulties persists, contact ICE or your distributor for assistance.

Information About Your Equipment

Power Unit Model: ICE 595E Serial Number_____

Engine Model: Caterpillar C15 Serial Number_____ Arrangement 254-3835

Filters

Part Number	Qty.	Description
CAT 106-3969	1	Air cleaner element-outer
CAT 106-3973	1	Air cleaner element-inner
CAT 326-1643	1	Fuel water separator
CAT 1R-0751	1	Fuel filter element
CAT 1R-0716	1	Lube oil filter element
ICE 100584	4	Hydraulic oil filter element 10 micron
ICE 935315	4	Hydraulic oil filter element 25 micron (optional)

Warranty

International Construction Equipment, Inc. Standard Warranty

International Construction Equipment, Inc., hereafter referred to as ICE, warrants new products sold by it to be free from defects in material and workmanship for a period of one year after date of delivery to the first user and subject to the following conditions:

ICE's obligation and liability under this warranty is expressly limited to replacing, at ICE's option, any parts that appear to ICE upon inspection to have been defective in material or workmanship. Such parts shall be provided at no cost to the user at the business establishment of ICE or at the ICE distributor of the product during regular working hours.

This warranty shall not apply to component parts or accessories not manufactured by ICE and which carry the warranty of the manufacturer thereof or to normal maintenance parts (such as filters).

Replacements or repair parts installed in the product covered by this warranty are warranted only for the remainder of the warranty as if such parts were original components of said product.

ICE's obligation under this warranty shall not include any transportation charges, costs of installation, duty, taxes or any other charges whatsoever, or any liability for direct, indirect, incidental, or consequential damage or delay.

If requested by ICE, products or parts for which a warranty claim is made are to be returned, transportation paid, to ICE.

Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution of parts not approved by ICE or any alteration or repair by others in such manner as in ICE's judgment affects the product materially and adversely shall void the warranty.

For impact pile hammers, driving in excess of 10 blows per inch (25mm) [set of 0.1 (2.5mm) per blow] is considered practical refusal. Driving in excess of 10 blows per inch (25mm) for more than 6 inches (150mm) or driving in excess of 20 blows per inch (25mm) at all is considered improper use and will void the hammer warranty.

For vibratory drivers, driving/extracting when the movement is less than 1" (25mm) per minute is considered practical refusal. Driving/extracting when movement is less than 1" (25mm) for more than 5 minutes of driving/extracting or driving at all when penetration is less than 1" (25mm) per minute and amplitude is greater than 1" (25mm) [vibrator and pile are bouncing] is considered improper use and will void the vibrator warranty. Driving/extracting when bearing covers (paint removed) are above 210°F (100°C) is considered improper use and will void the vibrator warranty. Use of a vibrator on a batter without discussing the operation with ICE and getting prior written approval is considered improper use and will void the vibrator warranty.

For limited-access drills and top-drive rotary heads, the use of a down-the-hole hammer without discussing the operation with ICE and getting prior written approval is considered improper use and will void the drill warranty.

For leads, use lengths or at batters exceeding the initial set-up without ICE evaluating the new set-up and providing prior written approval is considered improper use and will void the warranty.

Welding on power units or other equipment with electrical or electronic controls must be done with the battery leads disconnected. Welding with battery leads connected will void the warranty.

ICE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

No employee or representative is authorized to change this warranty unless such change is made in writing and signed by an officer of ICE.

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Table of Contents

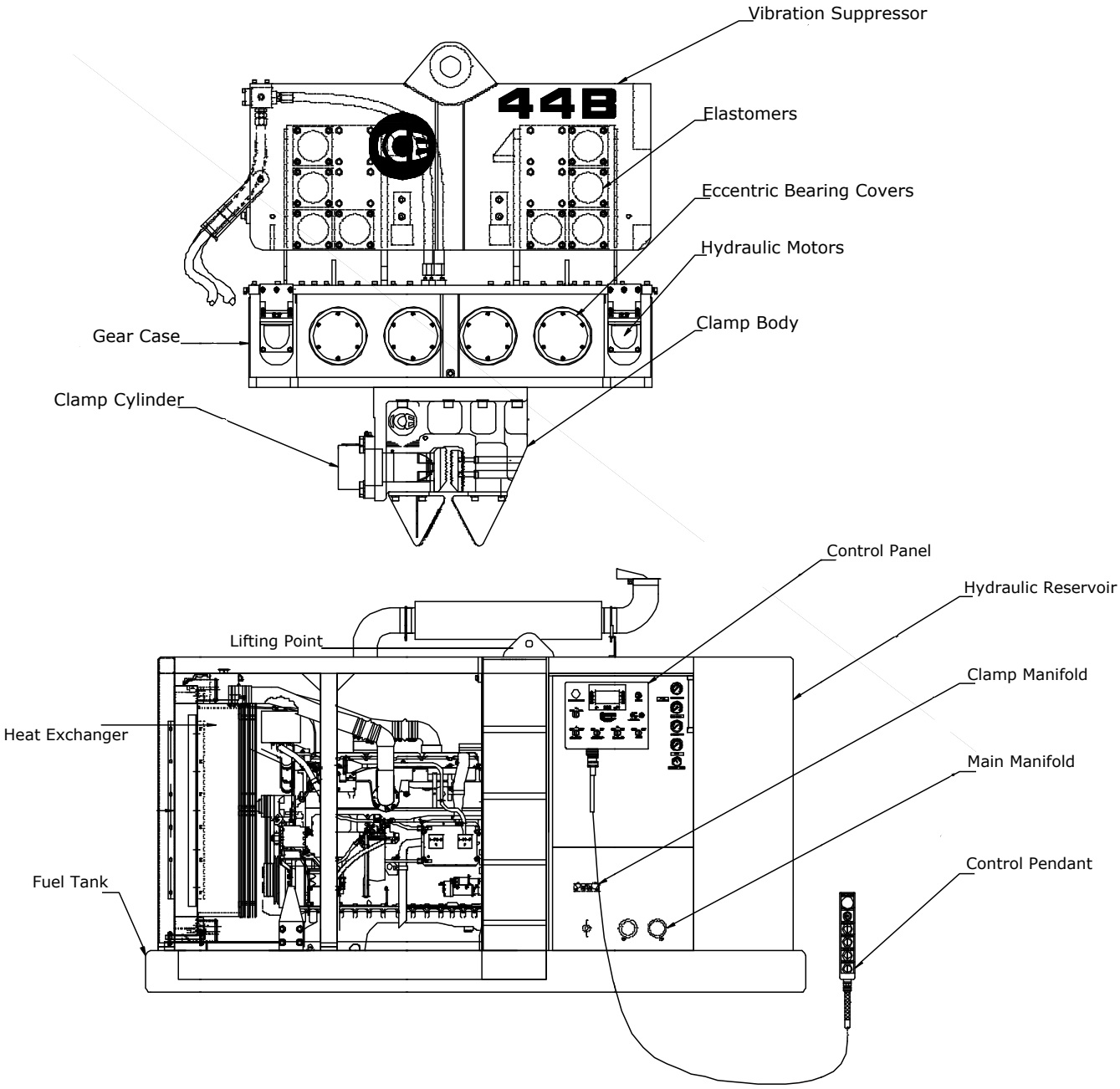
CONTENT **PAGE**

CONTENT **PAGE**

Section 1: Description

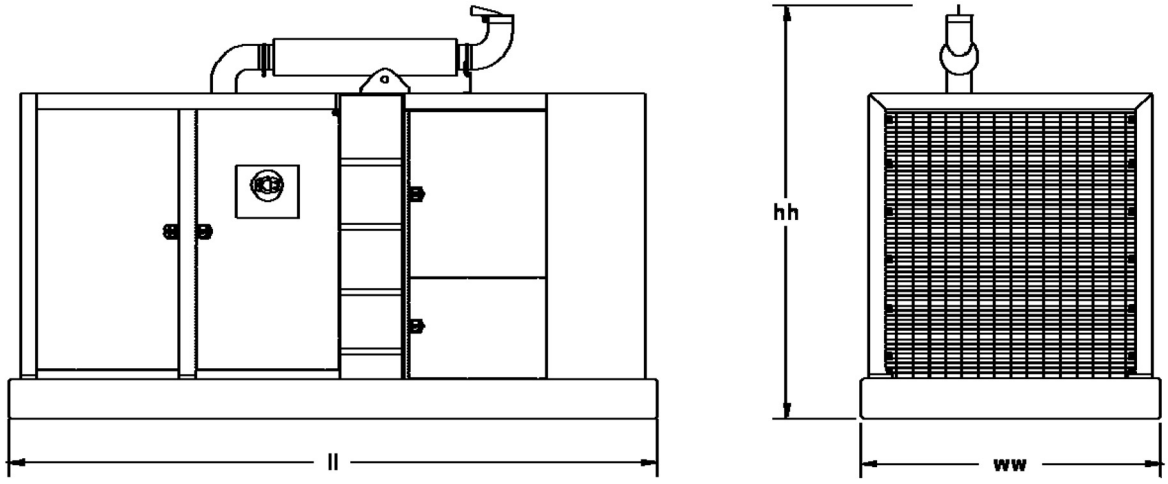
General Description

The Model 595E power unit is powered by a Caterpillar C15 Tier 3 diesel engine. The engine develops 595 horsepower (444 kW) at 1975 RPM and is mounted on a tubular sub-base that serves as a fuel tank. The Power Unit and Vibrator are operated from the control panel or remote-control pendant. Hydraulic oil is stored in the reservoir. A heat exchanger is mounted in front of the engine for engine cooling, oil cooling, and turbocharger after cooling. All components are contained in a sheet metal enclosure with lockable doors and a central lifting point.



Specifications

Constant improvement and engineering progress make it necessary that we reserve the right to make specification changes without notice. Please consult ICE for the latest available information.



Description	USA	SI
Engine	Caterpillar C15 Diesel	Caterpillar C15 Diesel
Power	595 HP	444 kW
Operating Speed	1975 rpm	1975 rpm
Drive Pressure	5500 psi	380 bar
Drive Flow (no load)	155 gpm	587 lpm
Clamp Pressure	4800 psi	331 bar
Clamp Flow	6 gpm	21 lpm
Weight	16,000 lbs	7258 kg
Length (ll)	159 in	4039 mm
Width (ww)	74 in	1867 mm
Height (hh)	99 in	2515 mm
Hydraulic Reservoir	430 gal	1628 liters
Fuel Capacity	150 gal	568 liters

Section 2: Parts Information

General Parts Information

The following abbreviations are used throughout the parts lists and other parts of the manual.

Abbreviation	Definition
ASM	Assembly
BHCS	Button Head Cap Screw
Cyl	Cylinder
DC	Direct Current
FHCS	Flat Head Cap Screw
FLCS	Flanged Head Cap Screw
Ft	Foot
HC	High Collar
HHCS	Hex Head Cap Screw
HHPP	Hex Head Pipe Plug
HSSS	Hex Socket Set Screw
Hyd	Hydraulic
In	Inch
Lg	Long
mm	Millimeter
Mtg	Mounting

Abbreviation	Definition
NPT	National Pipe Thread
PHMS	Phillips Head Machine Screw
P/N	Part Number
Qty	Quantity
RHMS	Round Head Machine Screw
Sch	Schedule
SHCS	Socket Head Cap Screw
SHPP	Socket Head Pipe Plug
SHSS	Socket Head Shoulder Screw
S/N	Serial Number
Sol	Solenoid
TOE	Threaded One End
TEE	Threaded Each End
UNC	United Coarse Thread
UNF	United Fine Thread
V	Volts

Screw and bolt descriptions in abbreviated form are shown in the Description column of the part tables.

Listed below is a typical screw description: 0.50-13UNC X 1.50 SHCS

0.50	=	Diameter in inches
13UNC	=	Threads per inch, United Coarse Thread
1.50	=	Length in inches
SHCS	=	Screw type abbreviation

Listed below is a typical metric bolt description: M12-1.75 X 40 SHCS

M12	=	Diameter in millimeter
1.75	=	Threads pitch (1.75mm between threads)
40	=	Length in millimeters
SHCS	=	Screw type abbreviation

Serial Number Locations

The following ICE units are serial numbered separately:

Vibrator, power unit, clamp, caisson beam, 90° clamp plate.

In addition to the serial number plate itself on vibrators, power units and clamps, the serial number is stamped into each unit in one or more places as follows:

Type	Location
Vibrator	On top right side of suppressor housing On bottom flange of gear case under hydraulic motor
Power unit	Control panel side of unit at right corner of reservoir Beside fuel fill
Model 140C clamp	Between cylinder and pile guide On the flange of the hydraulic cylinder
Model 100BH clamp	On the flange of the hydraulic cylinder On casting next to hydraulic cylinder
Caisson beam	On end On side at end
90^{o} clamp plate	On end On top at end

Section 3: ORDERING PARTS

Ordering Procedures

When ordering parts, be sure to include the model and serial number of the unit or component. The serial number may be located by referring serial number location table. Confirm all telephone orders in writing immediately to avoid duplicating shipment.

Original Equipment

Where component serial numbers are given, these apply only to equipment and components originally furnished with the unit. Where equipment has been changed or upgraded, these numbers may not be an adequate description.

Shipment

State to whom shipment is to be made and method of shipment desired, otherwise ICE's own judgment will be used.

Shortages

Claims for shortages or errors should be made immediately upon receipt of parts. No responsibility will be assumed for delay, damage or loss of material while in transit. Broken, damaged or lost material should be refused or a full description made of damage or loss to the carrier agent on the freight or express bill.

Return of Parts

If for any reason parts are returned to the factory or to any distributor from whom these parts were obtained, you must first obtain permission to return the parts. Shipping instructions will be given along with this permission. A ten percent handling charge must be assessed against the returned shipment unless an error is made by the factory or by the distributor when filling your order.

Recommended Spare Parts

The recommended spare parts list contains parts which are useful in keeping down-time to a minimum, especially in remote sites where unforeseen communication, customs, or transportation problems could cause delay of the delivery of an awaited part. Spare parts may be ordered individually or as a package group as shown in the parts list.

Fitting Description Code

The Fitting Description Code describes hydraulic fittings. Use the Fitting Style Selector Chart to determine the type of fitting. This code is also used in the Hose Description Code.

FITT 2 L - 16 M 12 J 00 0 - 00L 0 0 0 1

INCH/METRIC INDEX
- 2 - INCH FITTING
- 9 - METRIC FITTING

CONFIGURATION OR SHAPE OF FITTING
- S - STRAIGHT FITTING
- L - 90 Deg. ELBOW
- V - 45 Deg. ELBOW
- T - TEE
- C - CAP
- P - PLUG
- U - UNION
- X - CROSS (4TH END FITTING REQ'D)

FIRST END SIZE
- INDEX 2 - 1/16THS OF AN INCH*
- INDEX 9 - MILLIMETERS
- SEE GENERAL SPECIFICATION INCH/METRIC INDEX

FIRST END FITTING STYLE
- SEE FITTING STYLE SELECTOR CHART

SECOND END SIZE
- IF APPLICABLE - SEE FIRST END SIZE

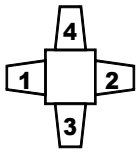
SECOND END FITTING STYLE
- IF APPLICABLE - SEE FIRST END FITTING STYLE

THIRD END SIZE
- IF APPLICABLE - SEE FIRST END SIZE

THIRD END FITTING STYLE
- IF APPLICABLE - SEE FIRST END FITTING STYLE

*** EXCEPTIONS**

90 = 10"	96 = 6"
92 = 12"	98 = 8"
94 = 14"	99 = NON CODE SIZE



FOURTH END SIZE & FITTING STYLE
(CROSSES ONLY)
SEE FIRST END FITTING SIZE OR END STYLE

LENGTH CODE (ELBOWS & NIPPLES)
- 00S - SHORT (ELBOW)
- 00M - MEDIUM (ELBOW)
- 00L - LONG (ELBOW)
- 00X - EXTRA LONG (ELBOW)
- 00C - CLOSE (NIPPLE)

PIPE NIPPLES (LONG) ONLY
IN DEC. INCHES FOR INDEX 2
- 050 = 5.0 INCHES
- 105 = 10.5 INCHES

IN MILLIMETERS FOR INDEX 9
- 120 = 12.0 MILLIMETERS
- 084 = 8.4 MILLIMETERS

INSTALLATION AID OR STYLE OF HEAD
- O - NOT APPLICABLE
- H - REGULAR HEX
- Q - SQUARE HEAD (EXT.)
- R - SQUARE HEAD (INT.)
- S - HEX HEAD (INT SOCKET)
- T - HEX HEAD (EXT.)

PRESSURE RATING
- 0 - NONE
- 1 - 125 LB.
- 3 - SCH40
- 4 - SCH80

SPECIAL NOTATIONS
- 4 - 046 ORIFICE
- 6 - 063 ORIFICE

MATERIAL
- 1 - CARBON STEEL
- 2- BRASS
- 4 - STAINLESS STL
- 5 - AAR MAL IRON
- 6 - MALLEABLE IRON
- 8 - FORGED STEEL

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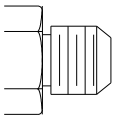
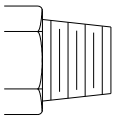
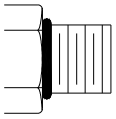
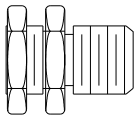
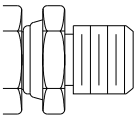
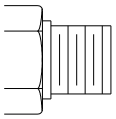
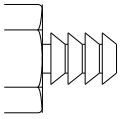
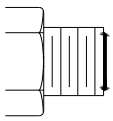
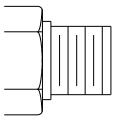
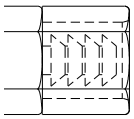
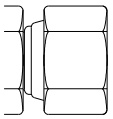
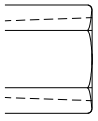
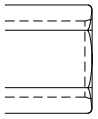
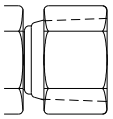
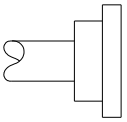
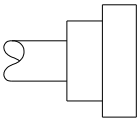
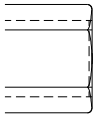
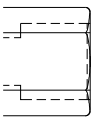
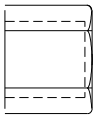
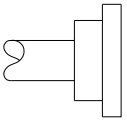
Fitting Style Selector Chart

M		JIC MALE 37 DEG. FLARE
P		MALE PIPE NPT
R		S.A.E. MALE O-RING (& ADJUSTABLE)
B		JIC MALE 37 DEG. FLARE BULKHEAD
D		MALE PIPE NPT SWIVEL
S		B.S.P. MALE PIPE
T		HOSE BARB
Y		ORB MALE O-RING (& ADJUSTABLE)
U		METRIC MALE FITTING
G		CRIMP HOSE END FITTING

J		JIC FEMALE 37 DEG. FLARE (& SWIVEL)
Q		FEMALE PIPE NPTF
K		S.A.E. FEMALE O-RING
N		FEMALE PIPE NPSM-SWIVEL
F		SPLIT FLANGE 3000 PSI CODE 61
H		SPLIT FLANGE 6000 PSI CODE 62
W		FEMALE BSP PIPE
X		ORB FEMALE O-RING
A		METRIC FEMALE FITTING
C		CATERPILLAR SPLIT FLANGE

10-DEC-07

Hose Description Code

HOSE 125 R11 F 9 24 P 0 20 L0395 - S

HOSE I.D. IN INCHES
2 PLACE DECIMAL
(125=1-1/4") (050=1/2") etc.

SAE OR MANUFACTURER RATING (or Special Code)
(PT4=Power Track)
(AQ1=Aeroquip H-Pac)
(TF1=Teflon)
(R01=SAE Rating 100R1) etc.

FIRST END-TYPE OF FITTING
(F=3000 lb Flange) (P=Male Pipe)
(H=6000 lb Flange) (M=37° Male JIC)
(J=JIC Swivel 37°)

FIRST END-BEND ANGLE
(0=None) (9=90°)
(3=30°) etc.

FIRST END-SIZE IN 1/16 ths

SECOND END-TYPE OF FITTING
(See codes for FIRST END)

SECOND END-BEND ANGLE
(See codes for FIRST END)

SECOND END-SIZE IN 1/16 ths

SPECIAL CODE
0 - None
D - Offset

HOSE GUARD:
C - Nylon cloth
F - Flat spring guard
L - Stainless steel braid
S - Wire spring guard
P - Plastic coil guard

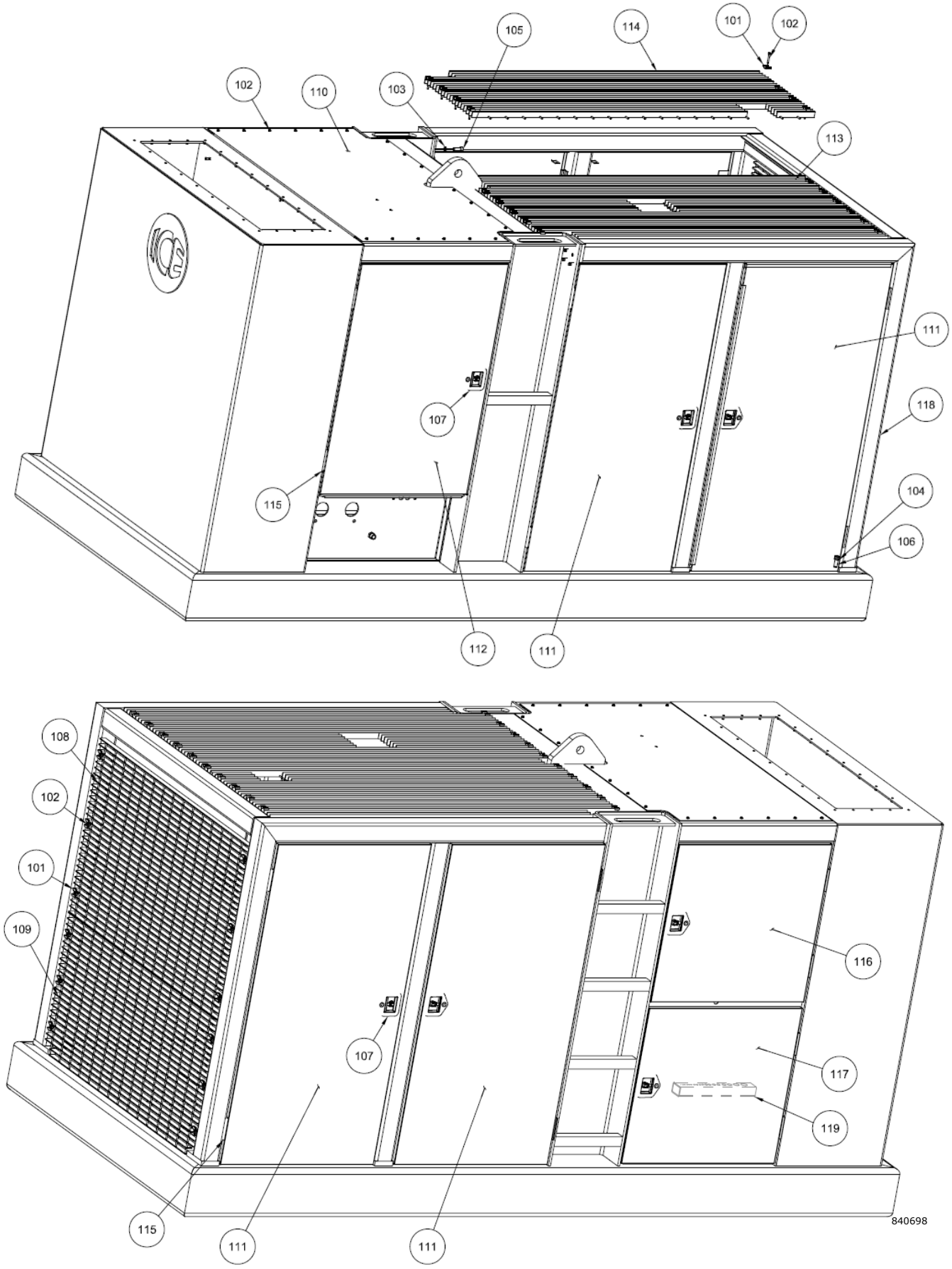
DROP LENGTH(ELBOWS):
00S - Short
00M - Medium
00L - Long
00X - Extra long

LENGTH IN INCHES
(1 PLACE DECIMAL)
(L0395=39-1 /2")
(L1242=124-1 /4")
etc.

10-Dec-07

Section 4: PARTS LISTS

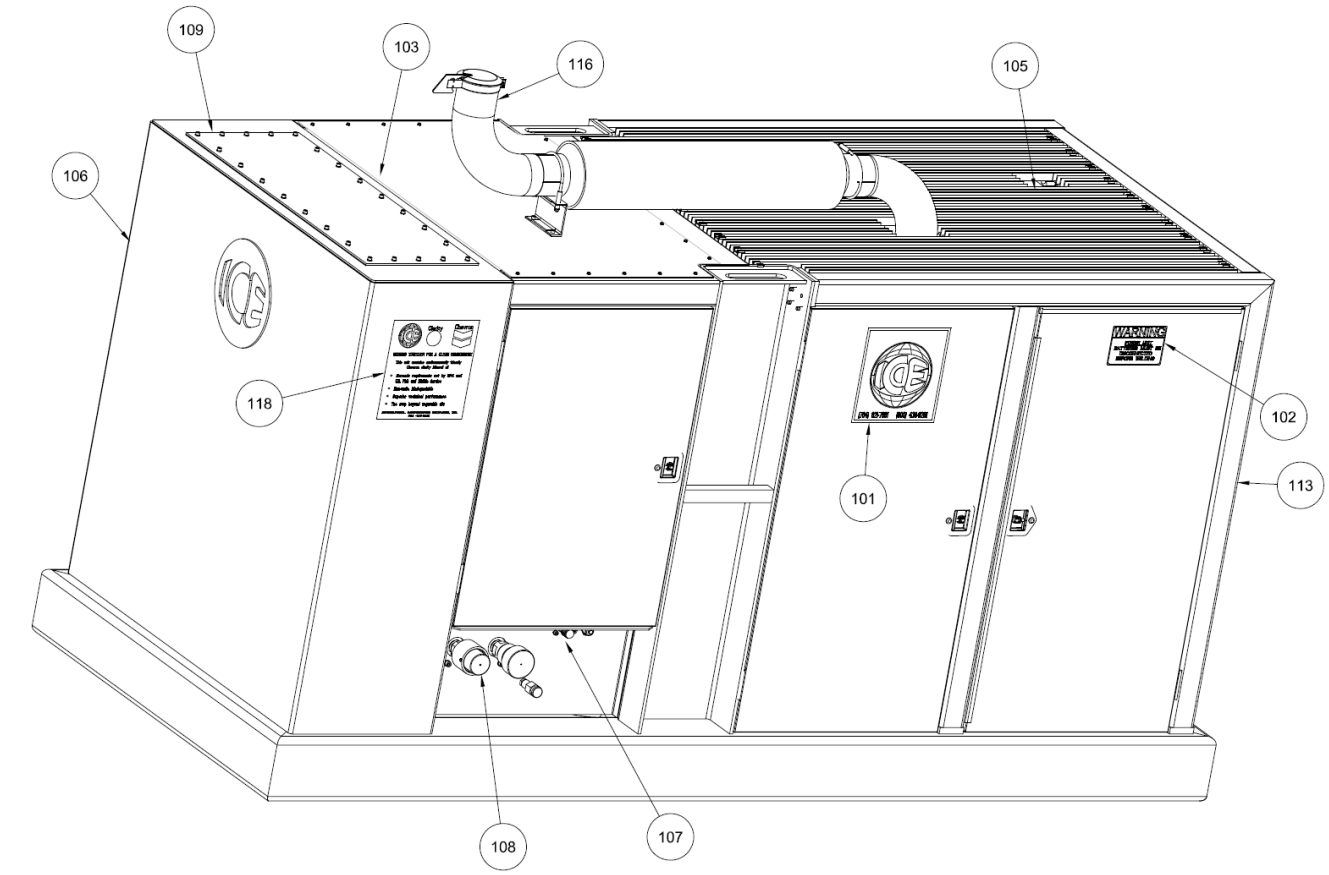
Power Unit Enclosure

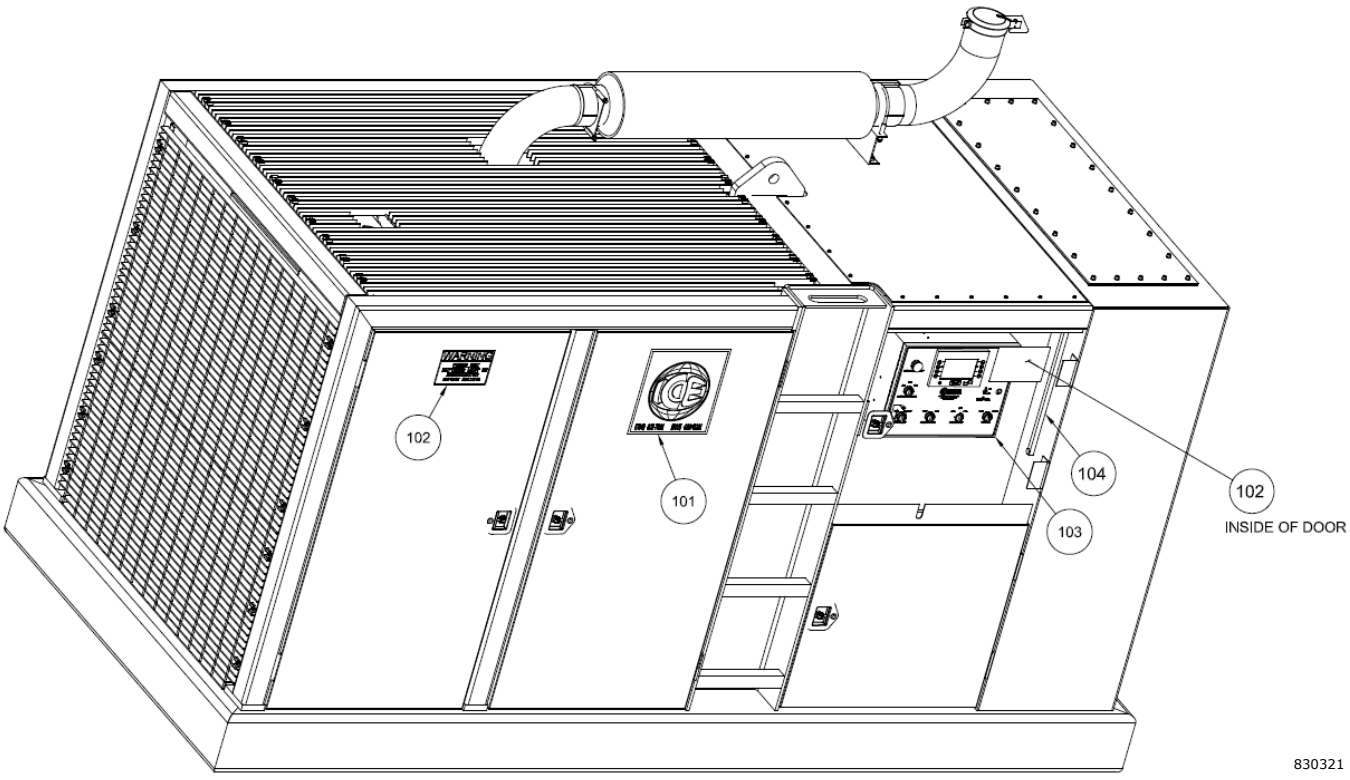


Power Unit Enclosure

Item	Part Number	Qty	Description
101	100398	26	Saddle Clips
102	110830	32	0.25x2 Tex Screw
103	1X30	7	0.50 Spring Lock Washer
104	1X8649	4	0.625 Hi-collar Lock Washer
105	1X8832	7	0.50-13UNC x 1.50 SHCS
106	1X8907	4	0.625-11UNC x 1.75 SHCS
107	702057	7	T-handle
108	730124	1	Upper Intake Grill
109	730125	1	Lower Intake Grill
110	730139	1	Top Cover
111	731199	4	Door G x 39.35
112	730145	1	Door
113	510261	1	Roof Grate
114	510262	1	Roof Grate
115	730432	14	Hinge
116	731000	1	Door
117	731002	1	Door
118	731113	1	Fuel Tank - Sub Base
119	100600	1	Hex Key Rack

Power Unit Assembly

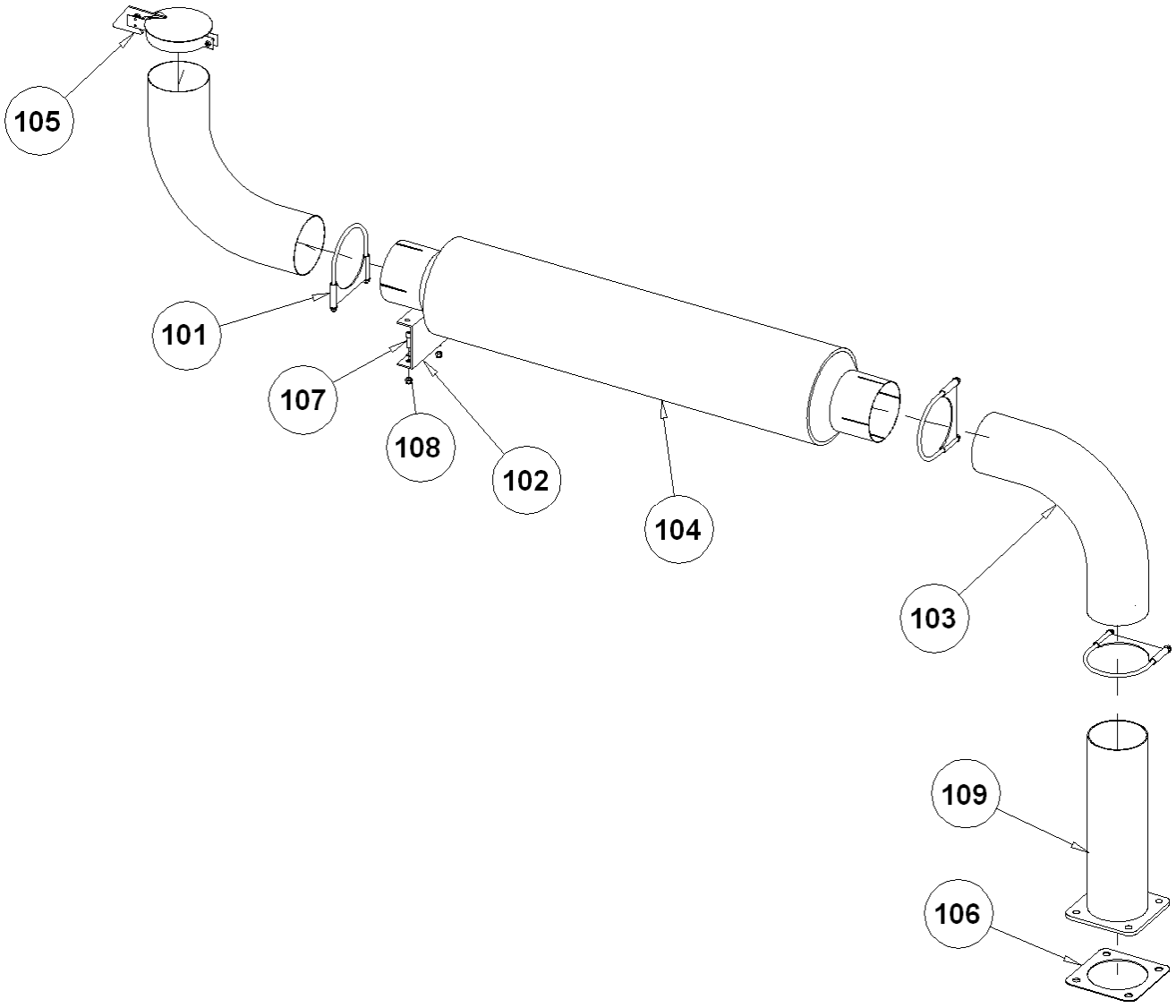




Power Unit Assembly

Item	Part Number	Qty.	Description
101	1X63	1	ICE Logo Decal
102	730879	2	Battery Warning Sticker
103	840089	1	Control Box Assembly
104	110355	1	Hydraulic Oil level Gauge
105	840205	1	Cooler Group Assembly
106	840207	1	Hydraulic Reservoir Assembly
107	840210	1	Clamp manifold Assembly
108	840211	1	Quick Disconnect Panel Assembly
109	840414	1	Reservoir Cover Assembly
113	840698	1	Power Unit Enclosure
116	840760	1	Exhaust Group
118	RPTL-46251	1	Chevron Clarity Sticker

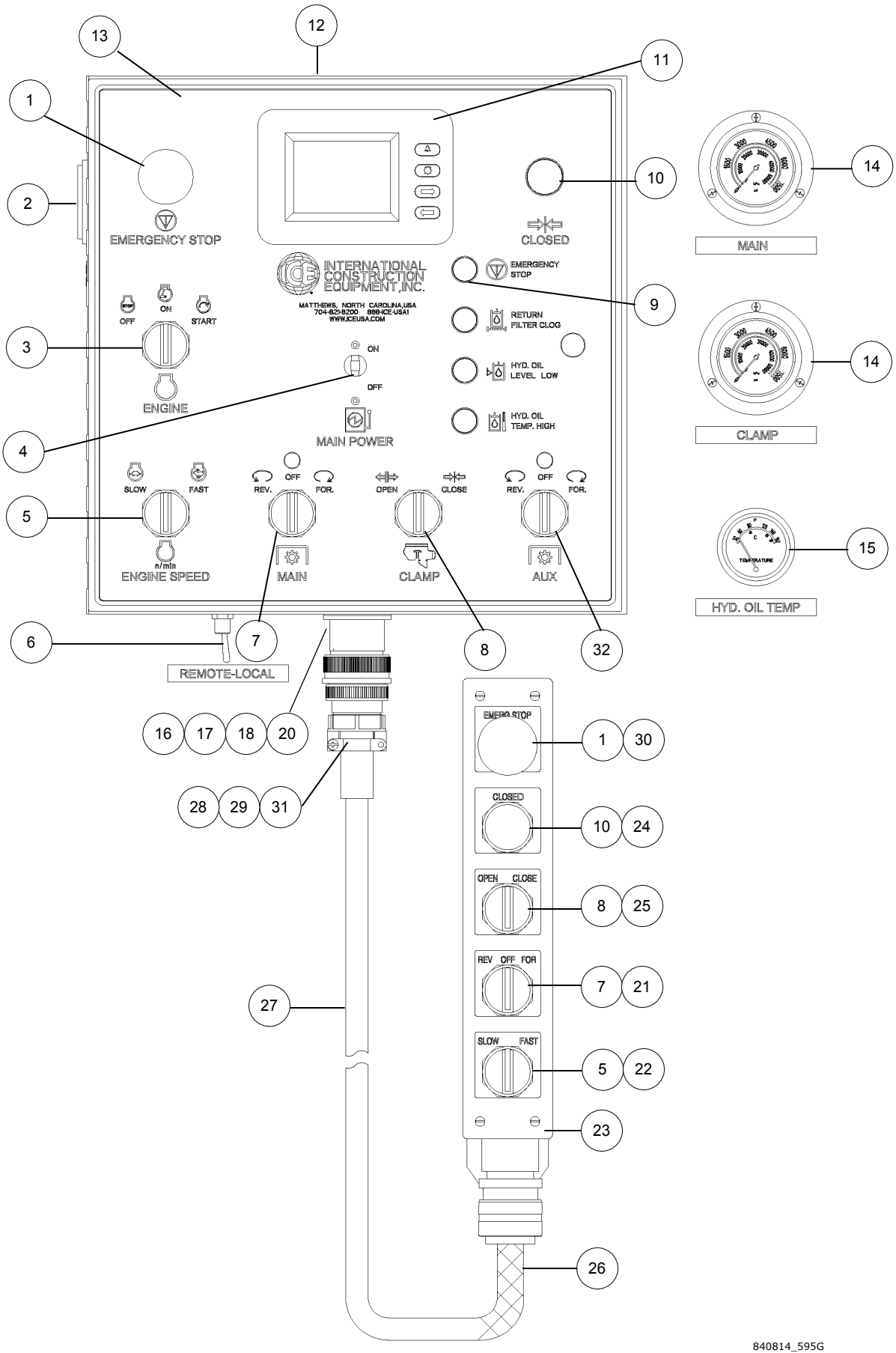
Engine Exhaust Group



Engine Exhaust Group

Item	Part Number	Qty	Description
101	100297	3	6 Inch Exhaust Pipe Clamp
102	110342	1	Muffler Support
103	110342	2	Exhaust Elbow
104	110504	1	Silencer
105	110695	1	6 Inch Rain Cap
106	110753	1	Exhaust Gasket
107	1X1783	2	0.375UNC x 1.25 SHCS
108	1X3809	2	0.375UNC Nyloc Nut
109	730165	1	Exhaust Adapter

Electronic Control Box Assembly – Exterior



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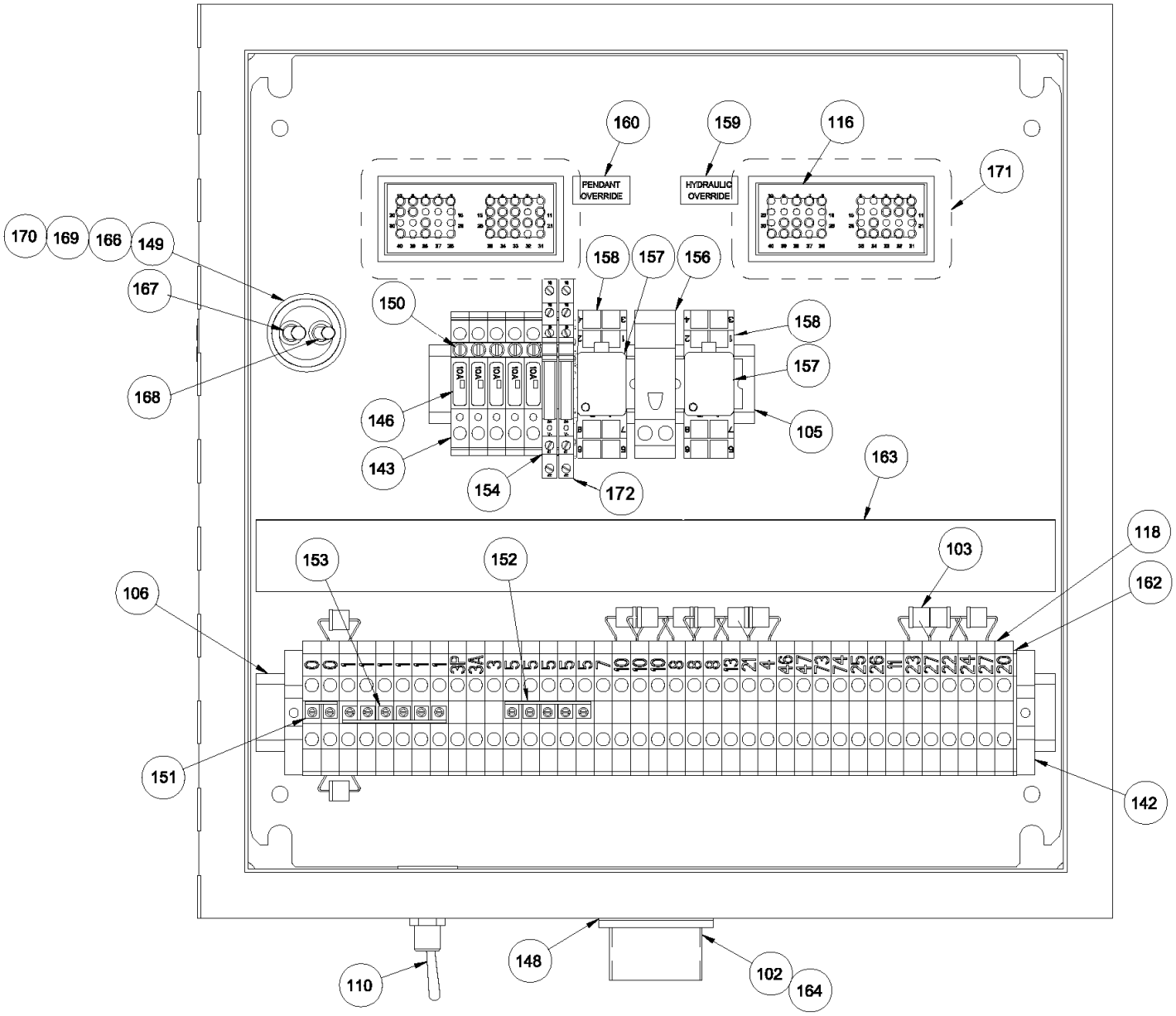
Electronic Control Box Assembly – Exterior

Item	Part Number	Qty	Description
1	510188	2	Emergency Stop Button
2	731156	1	Hour Meter
3	110615	1	Switch
4	140239	1	Main Power Switch/30 amp Breaker
5	100566	2	Switch
6	140361	1	Toggle Switch
	731190	1	Rubber Boot
7	731178	1	Switch
8	130155	1	Switch
9	840872	4	Fault Indicator
10	731153	2	Clamp Light Assembly
11	510101	1	Display
12	510222	1	Control Box Cabinet
13	750649	1	Control Box Overlay
14	110600	2	Gauge 0-7500 psi
15	110640	1	Hydraulic Temperature Gauge
16	110694	4	#6 Hex Nut
17	110696	4	#6 Spring Lock Washer
18	100397	1	Amphenol Receptacle
	731158	1	Gasket
19	740225	1	Female Amphenol Insert
20	100331	4	#6-32UNC X 0.25 BHCS
21	100864	2	REV-OFF-FOR Nameplate
22	100562	1	SLOW-FAST Nameplate
23	130505	1	Pendant Box
24	100403	1	CLOSED Nameplate
25	100401	1	OPEN-CLOSE Nameplate
26	730771	1	Strain Relief
27	731183	50	Pendant Cable/Ft.
28	100395	1	Amphenol Plug
29	740224	1	Male Amphenol Insert-Plug
30	130509	1	EMERGENCY STOP Label
31	100375	1	Amphenol Strain Relief
	100375-1	1	Rubber Insert (Included in Amphenol Stain Relief)
32	400718	1	Switch

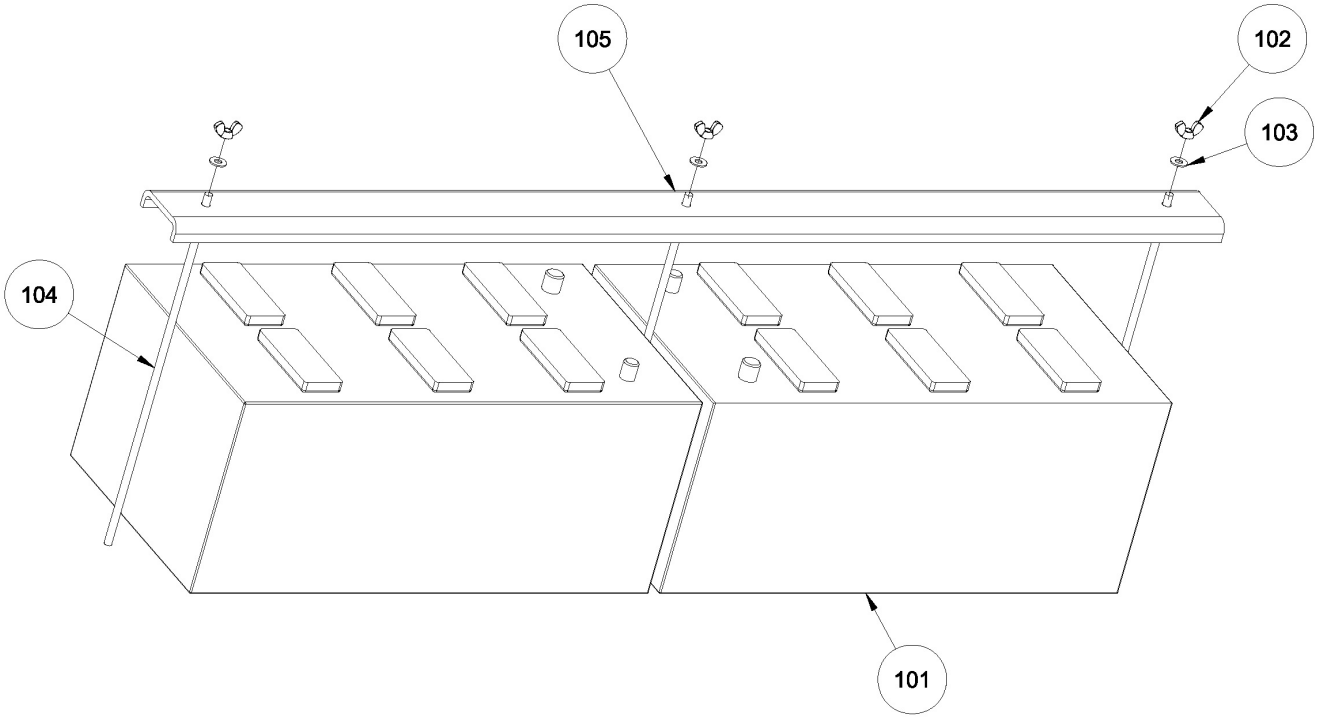
Electronic Control Box Assembly – Interior



Electronic Control Box Assembly – Interior

Item	Part Number	Qty	Description
102	100397	1	Amphenol Receptacle
103	100413	11	Diode
105	110569-55	1	Mounting Channel
106	110569-14	1	Mounting Channel
110	140361	1	Toggle Switch
116	730204	2	40 Pin Mount
118	731150	39	Terminal Block
142	731151	2	Terminal Block End
143	731152	5	Circuit Breaker Holder
146	731155	5	10A Breaker
148	731158	1	Seal
149	731159	1	Power Receptacle Seal
150	731166	1	5-Way Jumper
151	731168	1	2-Way Jumper
152	731175-5	1	Jumper
153	731175-6	1	Jumper
154	731201	1	Filter Lamp Relay
156	731179	1	Pushbutton Switch Maintenance Reset
157	731180	2	Relay
158	731181	2	Relay Socket
159	731185	1	Hydraulic Override
160	731185	1	Pendant Override
162	731186	1	End Barrier
163	731188	1	Wire Duct
164	740225	1	Female Amphenol Insert
166	770210	1	Power Receptacle
167	770212-PB	1	Pin Black
168	770212-PR	1	Pin Red
169	770214	1	Panel Nut
170	770215	2	Crimp Reducer
171	770292	2	Gasket
172	731176	1	Time Delay Relay

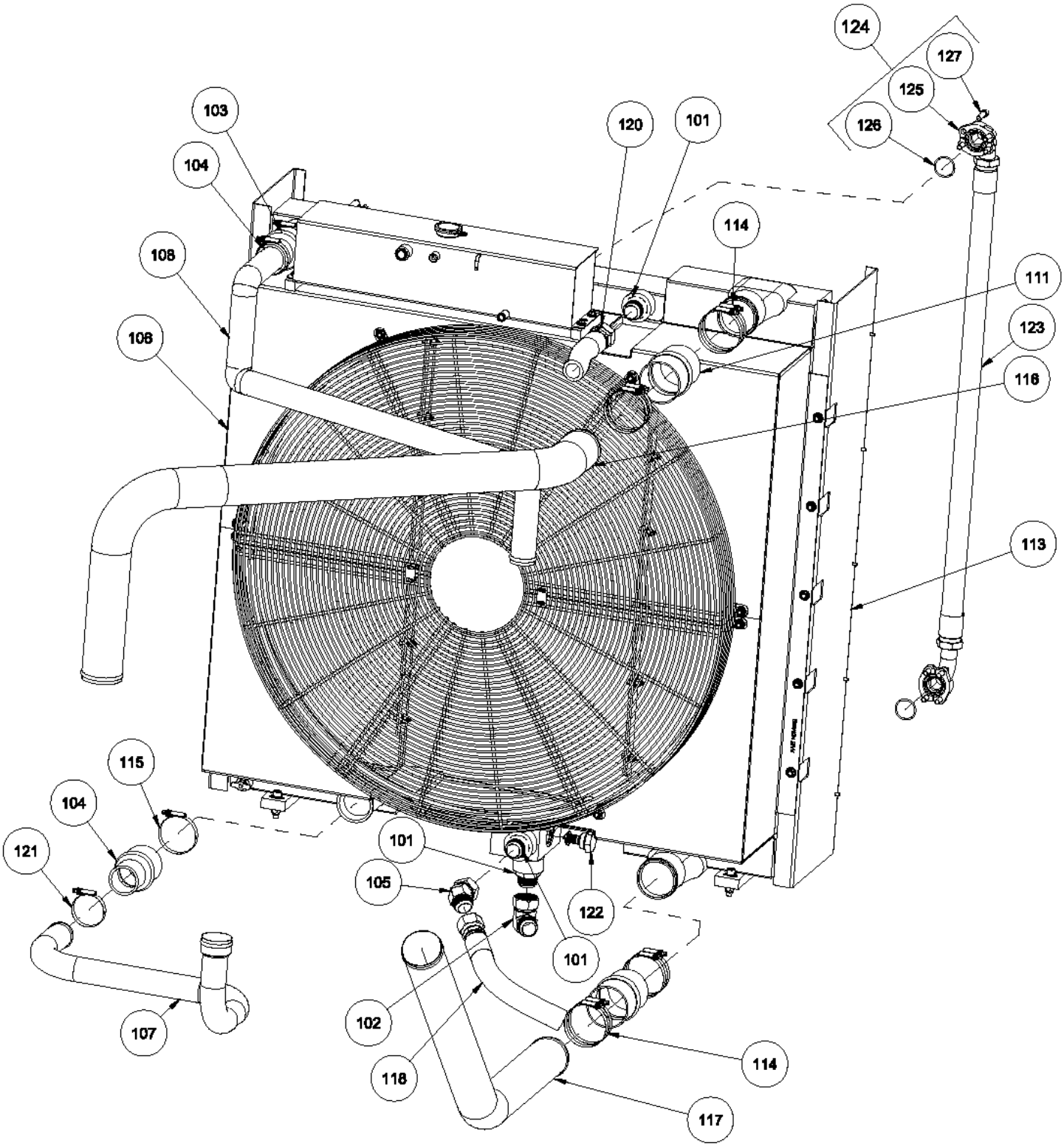
Battery Group



Battery Group

Item	Part Number	Qty	Description
101	100529	2	Battery
102	100831	3	Wing Nut 0.3128-18UNC
103	1X3	3	Flat Washer 0.3128
104	510115	3	Hold Down Stud
105	810653	1	Battery Hold Down

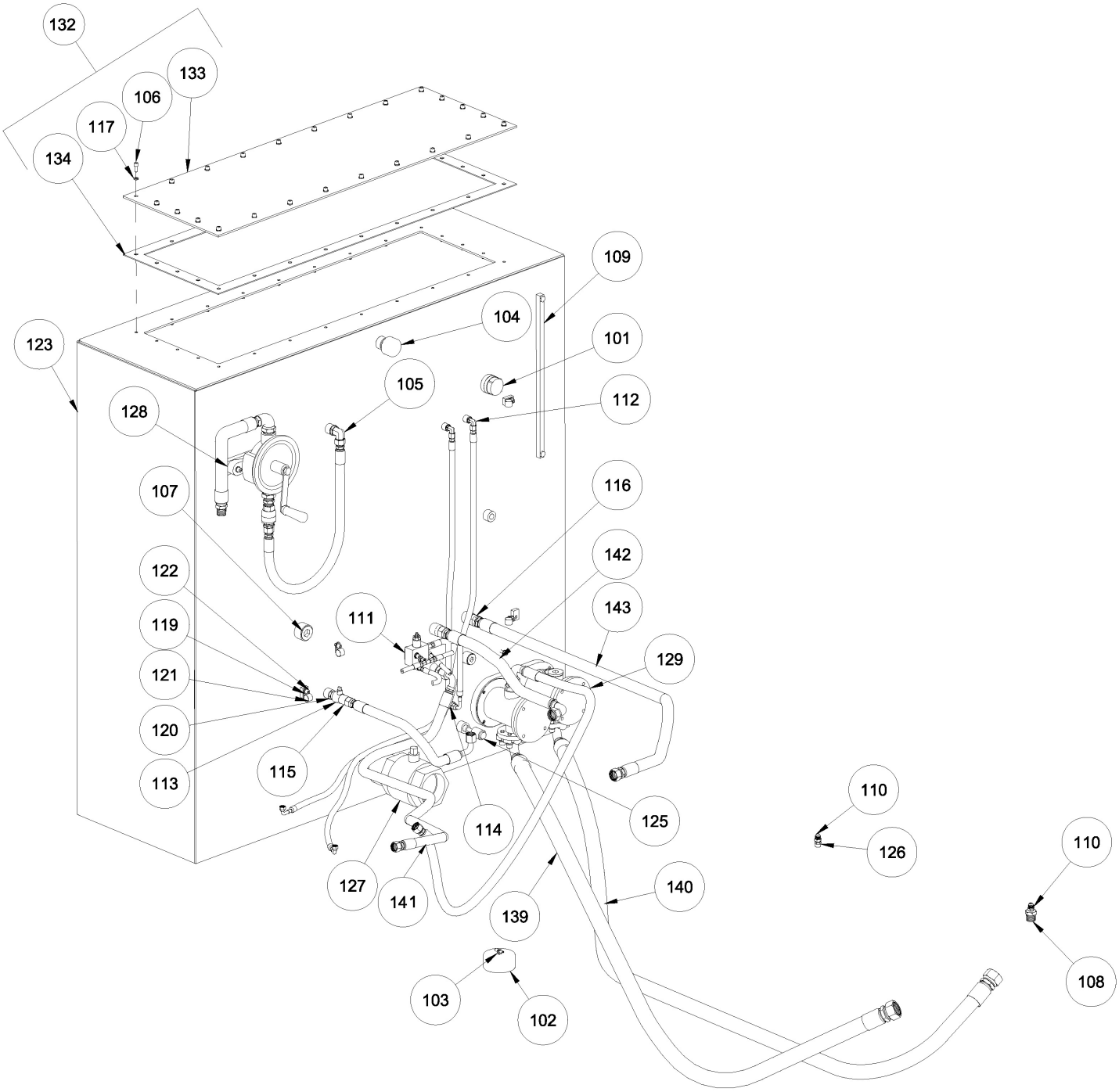
Cooler Assembly



Cooler Assembly

Item	Part Number	Qty	Description
101	730454	3	FITT2S24M24R000-000H001
102	100334	1	FITT2L-24J24M000-000H001
103	130209	10	0.25 x 0.625 Tex Screw
104	730186	2	Rubber Reducer
105	730788	1	FITT2V-24J24M000-000H001
106	510246	1	Cooler Package
107	730173	1	Lower Hose
108	730174	1	Upper Hose
109	1X4024	4	0.50-13UNC x 2.25 SHCS
110	1X6	8	0.50 Flat Washer
111	730200	2	4.00 Hump Hose
112	1X3808	4	0.50 UNC Nyloc Nut
113	730133	2	Cooler Bracket
114	730201	8	Constant Torque Clamp
115	730201	2	Constant Torque
116	730178	1	Upper ATAAC Pipe
117	730179	1	Lower ATAAC Pipe
118	510283	1	HOSE150R02J024F924L1335-0
120	510268	1	HOSE150R02J024J924L1510-0
121	730257	2	Constant Torque Clamp
122	510274	1	Thermostat
123	510292	1	By-pass Hose
124	840939	2	Split Flange Kit
125	100596	4	Split Flange Half
126	110119	2	2-225 O-ring
127	909820	8	M12-1.75 x 40 SHCS

Reservoir Assembly and Fuel Tank Fittings

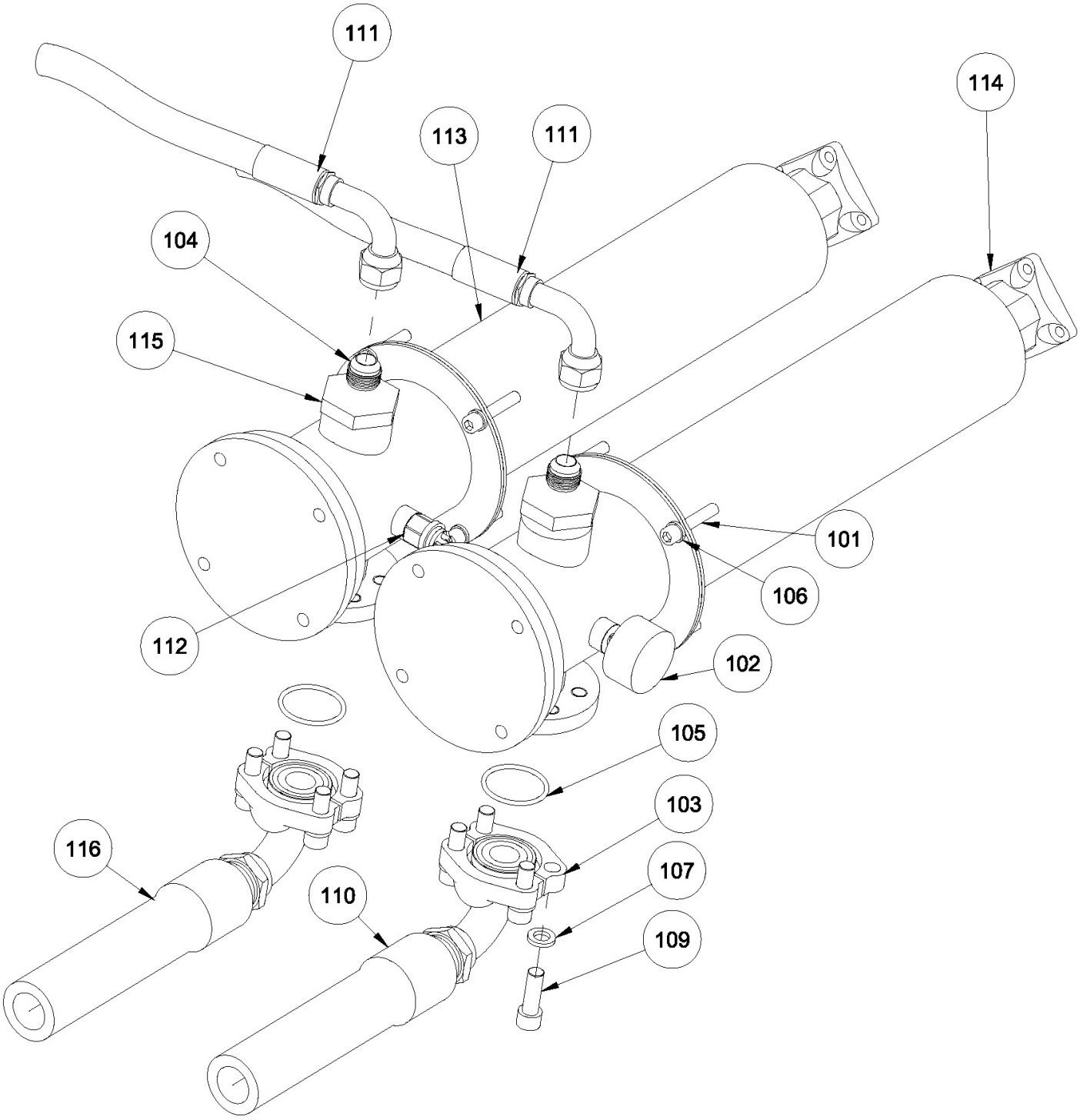


Item	Part Number	Qty	Description
101	100314	1	Float Switch
102	100417	1	FITT2C-48Q000000-0000306
103	100419	1	Petcock
104	100455	1	Breather
105	730649	1	FITT2L-12M12R000-000H001

Reservoir Assembly and Fuel Tank Fittings

Item	Part Number	Qty	Description
106	100648	1	0.375-16UNC x 0.875 SHCS
107	110298	1	FITT2P-20R000000-000S001
108	100715	1	FITT2S-16P06Q000-000H001
109	110355	1	Level Gauge
110	110630	2	FITT2S-08M06P000-000H001
111	840774	1	Load Sense Group
112	130057	2	FITT2L-06M06R000-000H001
113	170433	1	0.75 Ball Valve
114	1X8673	1	FITT2S-06M08R000-000H001
115	1X2597	1	FITT2S-12M12P000-000H001
116	1X8961	2	FITT2S-16M16R000-000H001
117	1X28	24	0.375 Spring Lock Washer
118	130829	1	FITT2P-16R000000-000S001
119	1X4	4	0.375 Flat Washer
120	908887	1	FITT2S-12P12R000-000H001
121	1X8605	4	Clamp
122	1X8611	4	0.375-24UNF X 0.625 SHCS
123	731112	1	Hydraulic Reservoir
124	1X8671	1	FITT2S-12M16R000-000H001
125	510178	1	Temperature Switch
126	110143	1	FITT2S-06Q06Q000-000H001
127	510095	1	Ball Valve
128	840208	1	Hand Pump Group
129	840209	1	Return Filter Assembly
130	510155	1	HOSE075R02J012J012L0240-0
131	510158	1	HOSE038R02J906J004L0160-0
132	840414	1	Reservoir
133	730418	1	Reservoir Cover
134	730419	1	Reservoir Cover Gasket
135	510270	1	HOSE075R02J012J916L0675-0
136	510271	1	HOSE075R02J012J012L0420-0
137	510272	1	HOSE038R02J006J006L0825-0
138	730380	1	HOSE075R02J012J012L0390-0
139	510283	1	HOSE150R02J024F924L1335-0
140	510284	1	HOSE150R02J024F924L1505-0
141	510282	1	HOSE075R02J012J912L0655-0
142	731141	1	HOSE100R02J016J916L0260-0
143	731142	1	HOSE100R02J016J016L0500-0

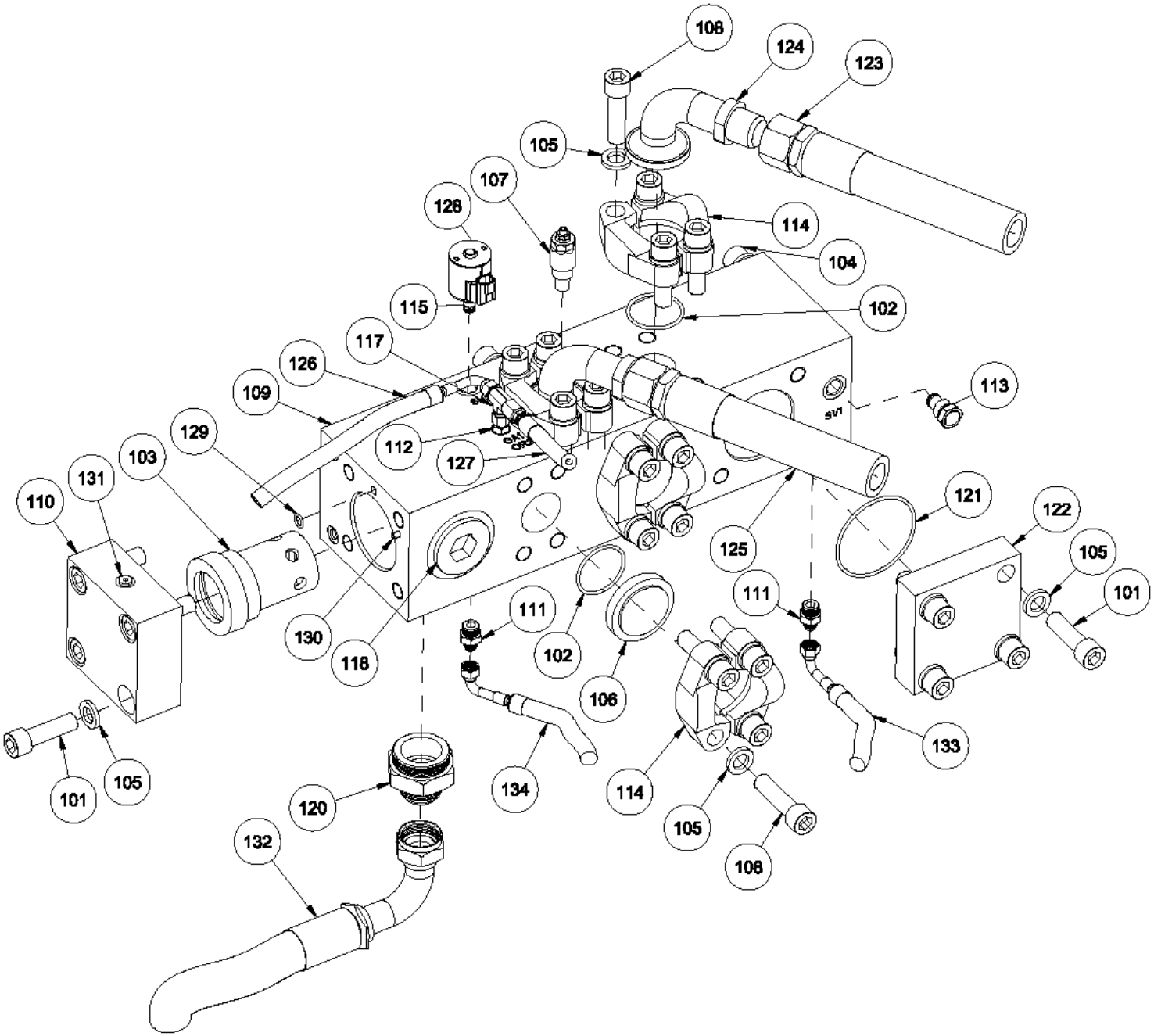
Return Filter Group



Return Filter Group

Item	Part Number	Qty	Description
101	100017	8	0.375-16UNC x 2.00 SHCS
102	100436	1	Filter Indicator
103	100596	4	24PA Split Flange Half
104	170501	2	FITT2S12M08R000-0000001
105	110119	2	2-225 O-ring
106	1X28	8	0.375 Spring Lock Washer
107	1X30	8	0.50 Spring Lock Washer
109	1X8832	8	0.50-13UNC x 1.50 SHCS
110	730893	1	HOSE150R02J024F924L1505-0
111	510270	2	HOSE075R02J012J916L0675-0
112	100602	1	Pressure Switch - Clog Filter
113	750372	2	Return Filter Assembly
114	760050	1	Check Valve
115	840704	1	Modified 24 Plug
116	730892	1	HOSE150R02J024F924L1335-0
	100584	4	Hydraulic oil filter element 10 micron
	935315	4	Hydraulic oil filter element 25 micron (optional)

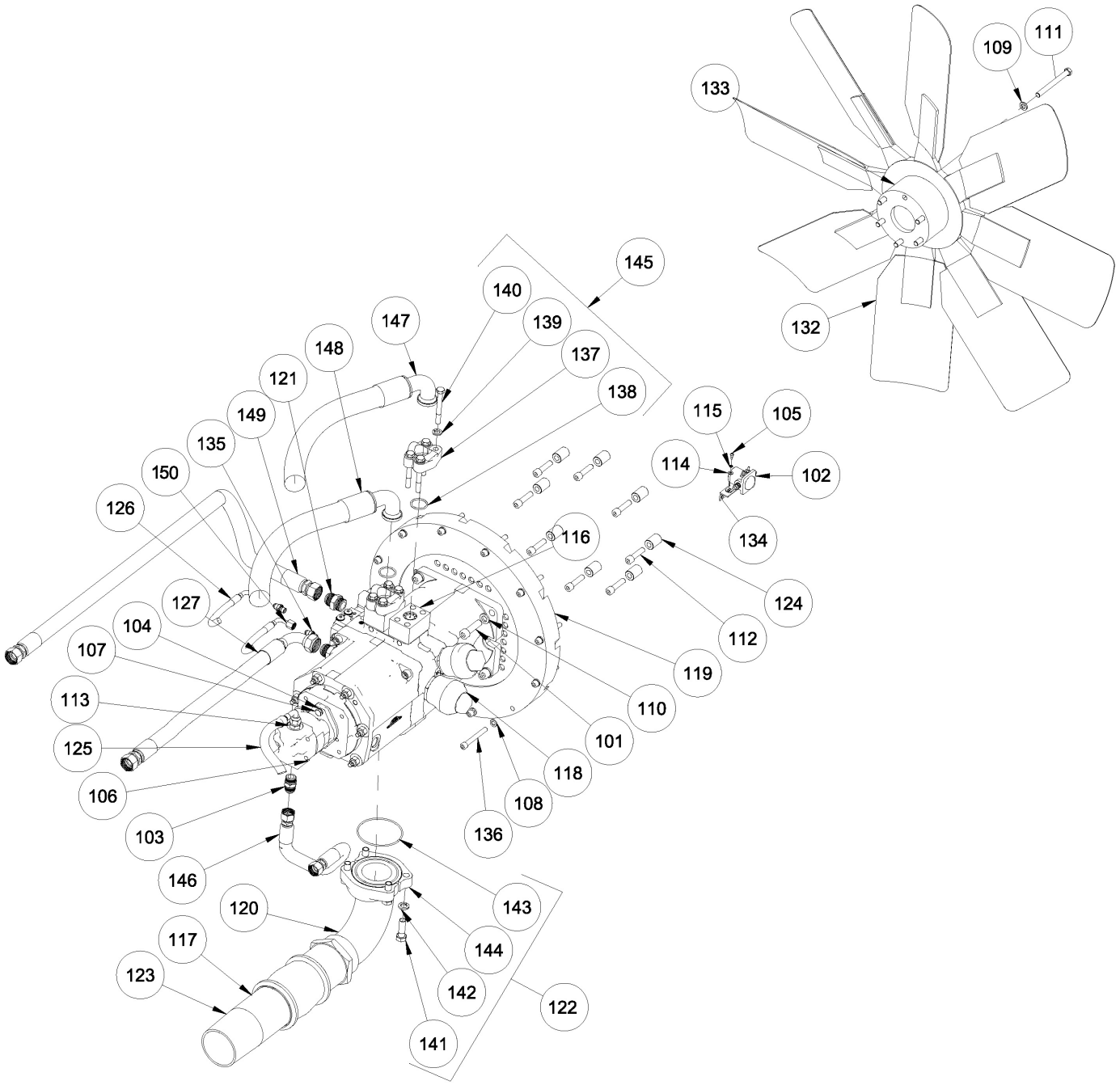
Main Hydraulic Control Manifold



Main Hydraulic Control Manifold

Item	Part Number	Qty	Description
101	100067	8	0.75-10UNC x 2.50 SHCS
102	140233	2	2-228 O-ring
103	140669	1	Cartridge Valve
104	1X1286	4	0.75-10UNC x 1.50 SHCS
105	1X32	28	0.75 Spring Lock Washer
106	510275	2	Blank Plug
107	750408	1	Relief Valve
108	400039	16	0.75-10UNC x 2.75 SHCS
109	510071	1	Drive Manifold
110	510091	2	Cartridge Cover
111	1X8673	2	FITT2S-06M08R000-000H001
112	100936	1	FITT2S-06M04R000-000H001
113	510235	1	Cavity Plug
114	750432	4	32PH Split Flange Half
115	750513	1	Solenoid Valve
117	730240	1	FITT2T-06M06M06J-000H001
118	1X838	1	FITT2P-24R000000-000S001
119	510223	1	FITT2P-02P000000-000H078
120	510266	1	FITT2S24M32R000-000H001
121	140901	1	2-241 O-ring
122	140899	1	Blanking Plate
123	510130	1	HOSE150PT4J920J024L0495-0
124	510120	2	FITT2L-32H24M-00MH001
125	510131	1	HOSE150PT4J920J024L0450-0
126	510265	1	HOSE038R02J006J906L0405-0
127	510267	1	HOSE025R02J004J006L0340-0
128	780108	1	EM-27-10 Coil
129	110602	1	2-111 O-ring
130	110616	1	0.25 x 0.63 Roll Pin
131	770242	1	FITT2P-04R000000-000S00
132	510268	1	HOSE150R02J024J924L1510-0
133	510271	1	HOSE038R02J006J906L0720-0
134	510272	1	HOSE038R02J006J906L0825-0

Engine Fan, Starter Relay and Hydraulic Pump

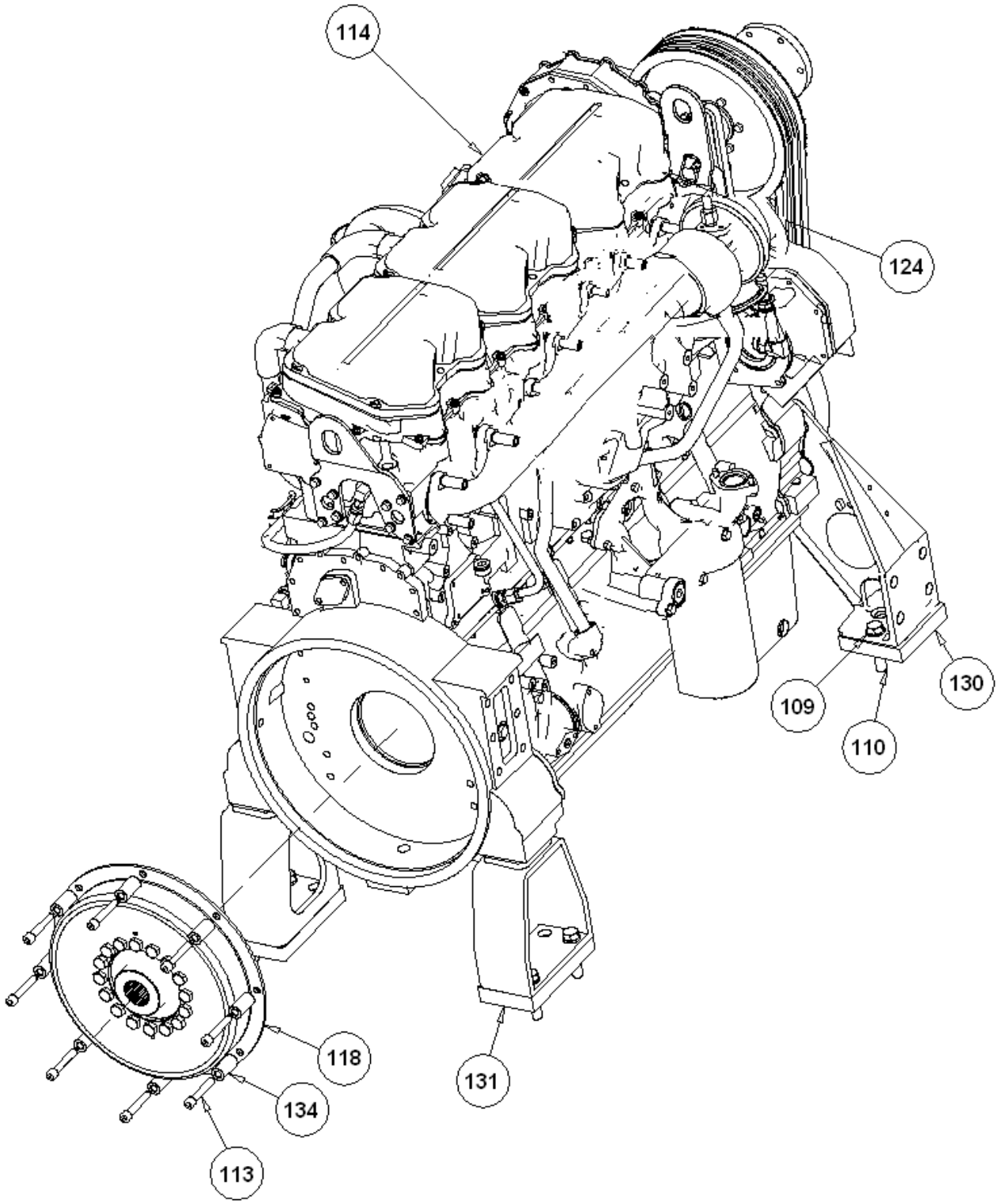


Item	Part Number	Qty	Description
101	100085	4	0.625-11UNC x 2.25 SHCS
102	100504	1	24V Starter Relay
103	100609	1	FITT2S-12M12R000-000H001
104	909302	2	M10 Split Lock Washer
105	110861	2	10-32 x 0.50 PHMS
106	170393	1	Clamp Pump
107	909314	2	M10-150 x 60 HHCS
108	1X29	12	0.4375 Spring Lock Washer

Engine Fan, Starter Relay and Hydraulic Pump

Item	Part Number	Qty	Description
109	1X30	6	0.50 Spring Lock Washer
110	1X31	4	0.625 Spring Lock Washer
111	1X3765	6	0.50-13UNC x 5.00 HHCS
112	1X5520	8	0.50-13UNC x 2.00 SHCS
113	1X8763	1	FITT2S-08M10R000-000H001
114	300671	2	#10 Flat Washer
115	400161	2	#10 Split Lock Washer
116	500120	1	Check Valve
117	500122	1	4.00 Flex Coupling
118	510070	1	Tandem Drive Pump
119	510093	1	Pump Adapter
120	510094	1	64PA Bent Stem Adapter
121	510150	2	FITT9S-16M27U000-000H001
122	510127	1	64 PA Split Flange Kit
123	510179	1	Suction Tube
124	510190	8	Flywheel Spacer Vane
125	731137	1	HOSE050R02J008J908L0305-0
126	510277	2	HOSE038R02J906J004L0315-0
127	731141	1	HOSE100R02J016J916L0260-0
132	730094	1	595E Fan
133	730167	1	Fan Spacer
134	730813	1	Starter Solenoid Bracket
135	740172	2	FITT9S-06M14U000-000H001
136	760235	12	0.4375-14UNC x 3.50 SHCS
137	110986	4	20 PH Split Flange Half
138	100037	2	2-222 O-ring
139	909451	8	M14 Split Lock Washer
140	909405	8	M12-1.75 x 1.00 HHCS
141	909511	4	M16-2.00 x 50 HHCS
142	909502	4	M16 Split Lock Washer
143	1X8985	1	2-245 O-ring
144	510134	2	64 PA Split Flange
145	840682	2	20 PH Split Flange
146	510155	1	HOSE075R02J012J012L0240-0
147	510131	1	HOSE125PT4J024H920L0450-0
148	510130	1	HOSE125PT4J024H920L0495-0
149	731142	1	HOSE100R02J016J016L0500-0
150	510276	1	HOSE025R02J004J906L0330-0

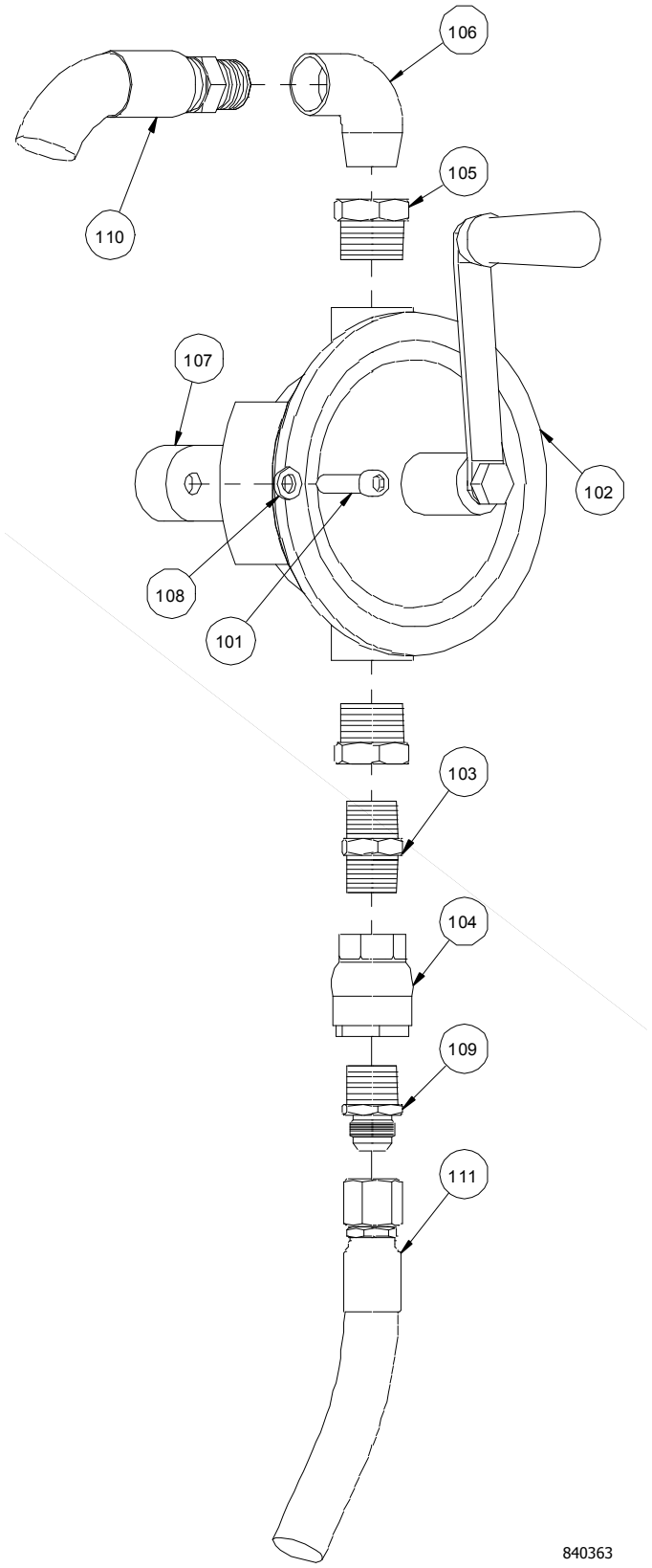
Engine, Mounts, Coupling and Belt Set



Engine, Mounts, Coupling and Belt Set

Item	Part Number	Qty	Description
109	1X32	4	0.75 Lock Washer
110	1X8479	4	0.75-10UNC x 3.5HHCS
113	1X5520	8	0.50-13UNC x 2.00 SHCS
114	730816-SE	1	C15 Cat Engine
118	500123	1	Coupling
124	730217	1	Fan Belt Set
130	750508	2	Front Engine Mount
131	750510	2	Rear Engine Mount
134	510190	8	Flywheel Spacer Vane

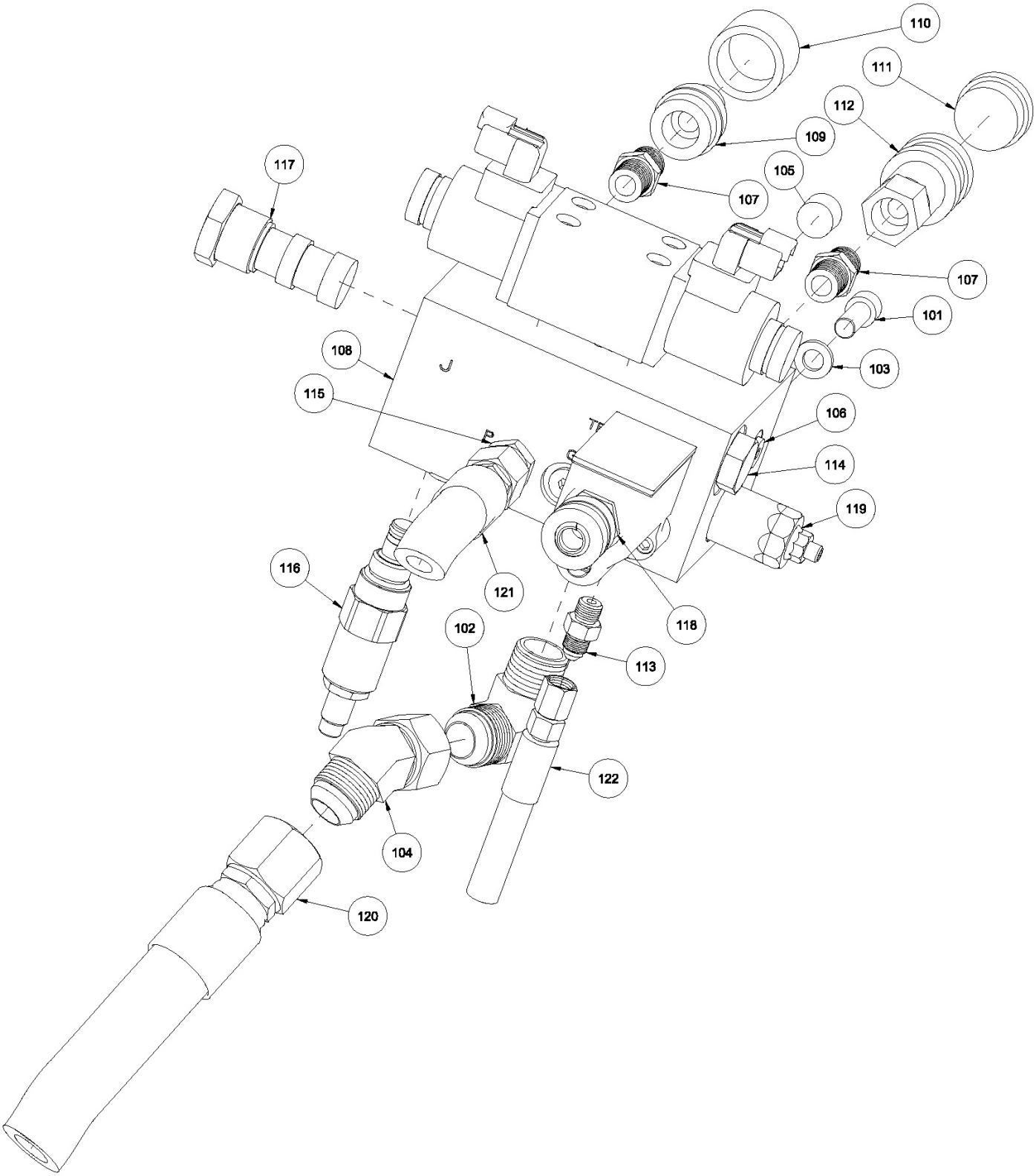
Hand Pump Assembly



Hand Pump Assembly

Item	Part Number	Qty	Description
101	100439	2	0.437-14UNC X 1.75 SHCS
102	100447	1	Hand Pump
103	100449	1	FITT2S-16P16P000-000H001
104	100451	1	Check Valve (C13)
105	110089	2	FITT2S-20PQ000-000H001
106	110377	1	FITT2L-16P16Q000-000306
107	130091	1	Pump Mounting Bracket
108	1X29	2	0.4375 Lock washer
109	300119	1	FITT2S-12M16P000-000H001
110	400215	1	HOSE100R01P016P016L0840-0
111	730288	1	HOSE075R01J012J012L0335-0

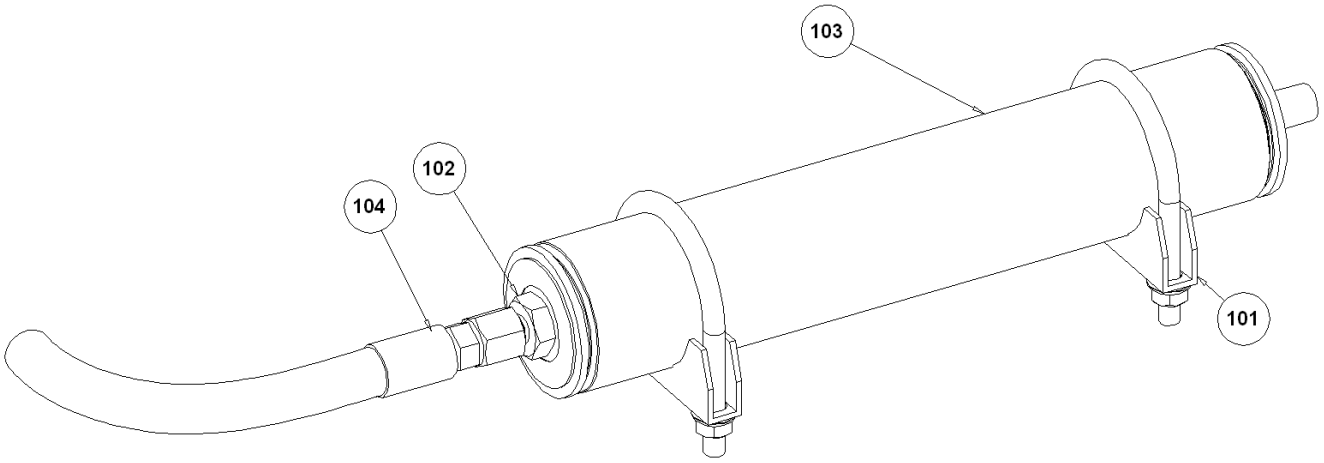
Clamp Manifold Assembly



Clamp Manifold Assembly

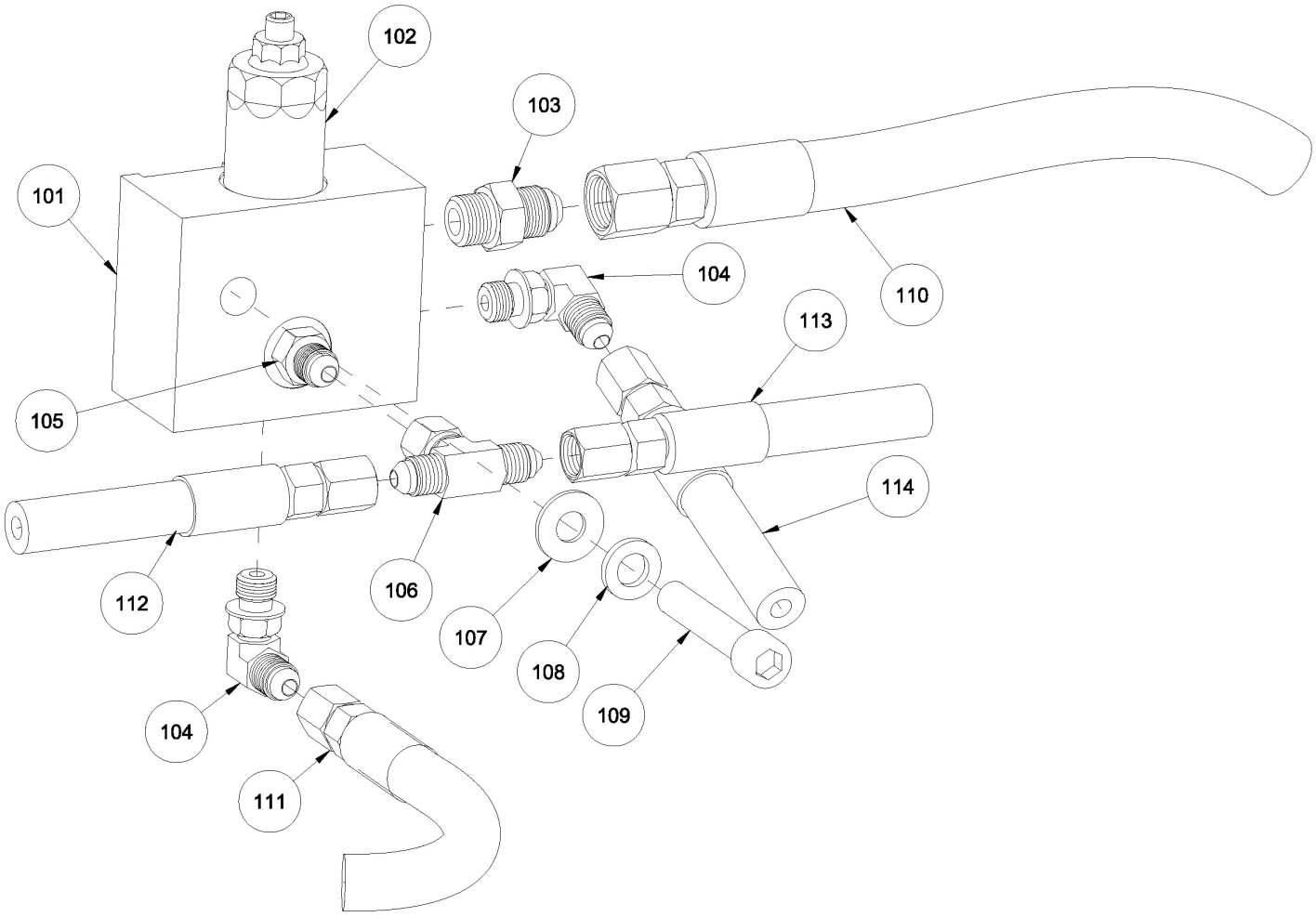
Item	Part Number	Qty	Description
101	1X1782	3	0.375-16UNC X 1.00 SHCS
102	100489	1	FITT2L-12M12P000-000H001
103	1X28	3	0.375 Spring Lock Washer
104	300231	1	FITT2V-12J12M000-000H001
105	1X825	3	FITT2P-06P000000-000S001
106	730933	8	FITT2P-04R000000-000S001
107	110794	2	FITT2S-06P06P000-000H001
108	840088	1	Clamp Stack R05
109	100245	1	0.375 Male Disconnect
110	100257	1	0.375 Dust Cap
111	100737	1	0.375 Dust Plug
112	100777	1	0.375 Female Disconnect
113	1X8768	1	FITT2S-04M04R000-000H001
114	750024	1	Shuttle Valve
115	110630	1	FITT2S-04M04R000-000H001
116	750693	1	Relief Valve
117	760036	1	Check Valve
118	840477	1	Pressure Switch
119	750408	1	Relief Valve
120	730881	1	HOSE075-R01J012J012L0700
121	730961	1	HOSE050R02J008J908L04650
121	730961	1	HOSER02J008J908L04650
122	731196	1	HOSE025R02J004J904L0XXXX

Accumulator Group



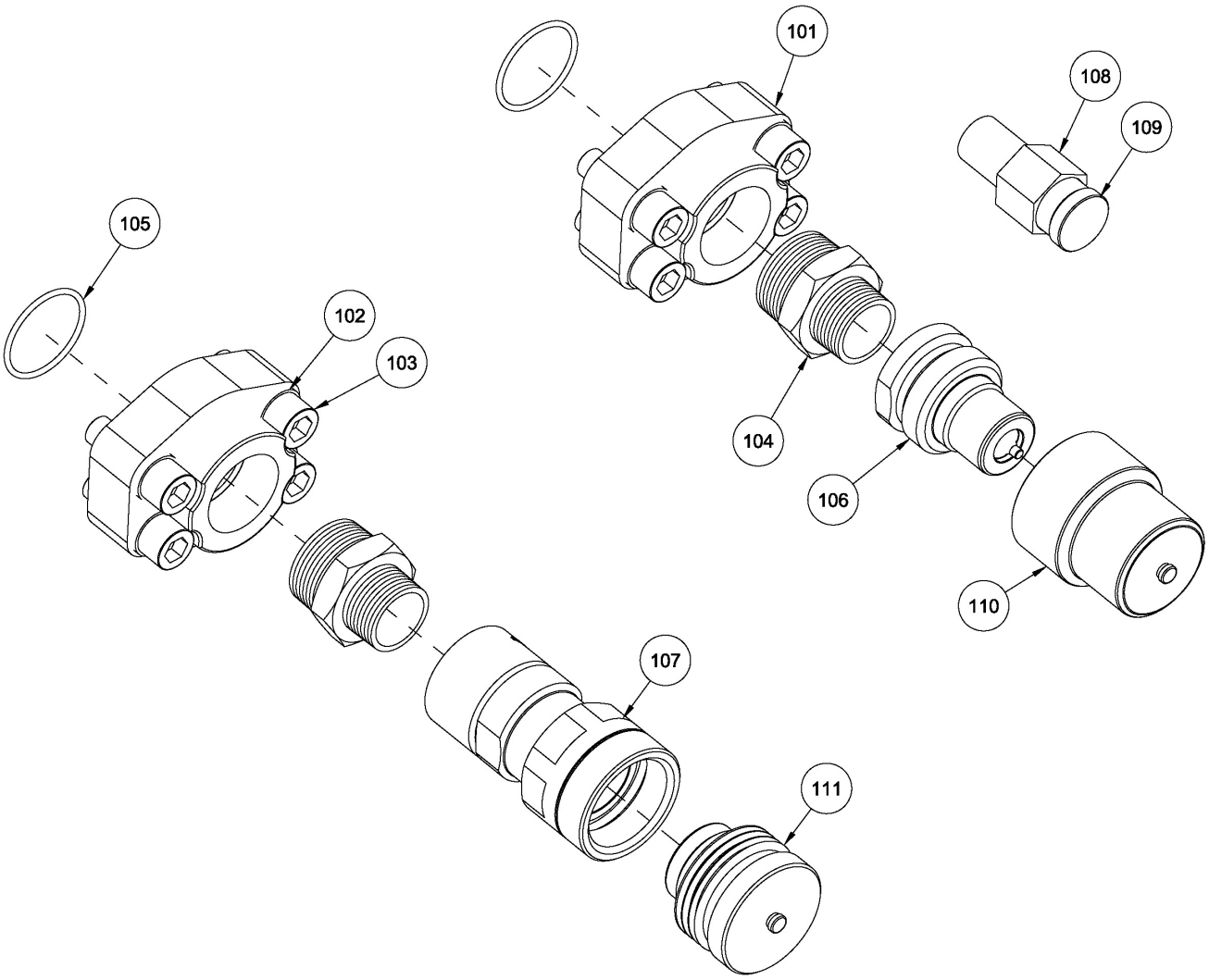
Item	Part Number	Qty	Description
101	100461	2	U Bolt Assembly
102	130645	1	FITT2S-06M08R000-000H001
103	750064	1	Accumulator Assembly
104	510265	1	HOSE038R02J006J906L0405-0

Load Sense Relief Valve Group - Main Pump



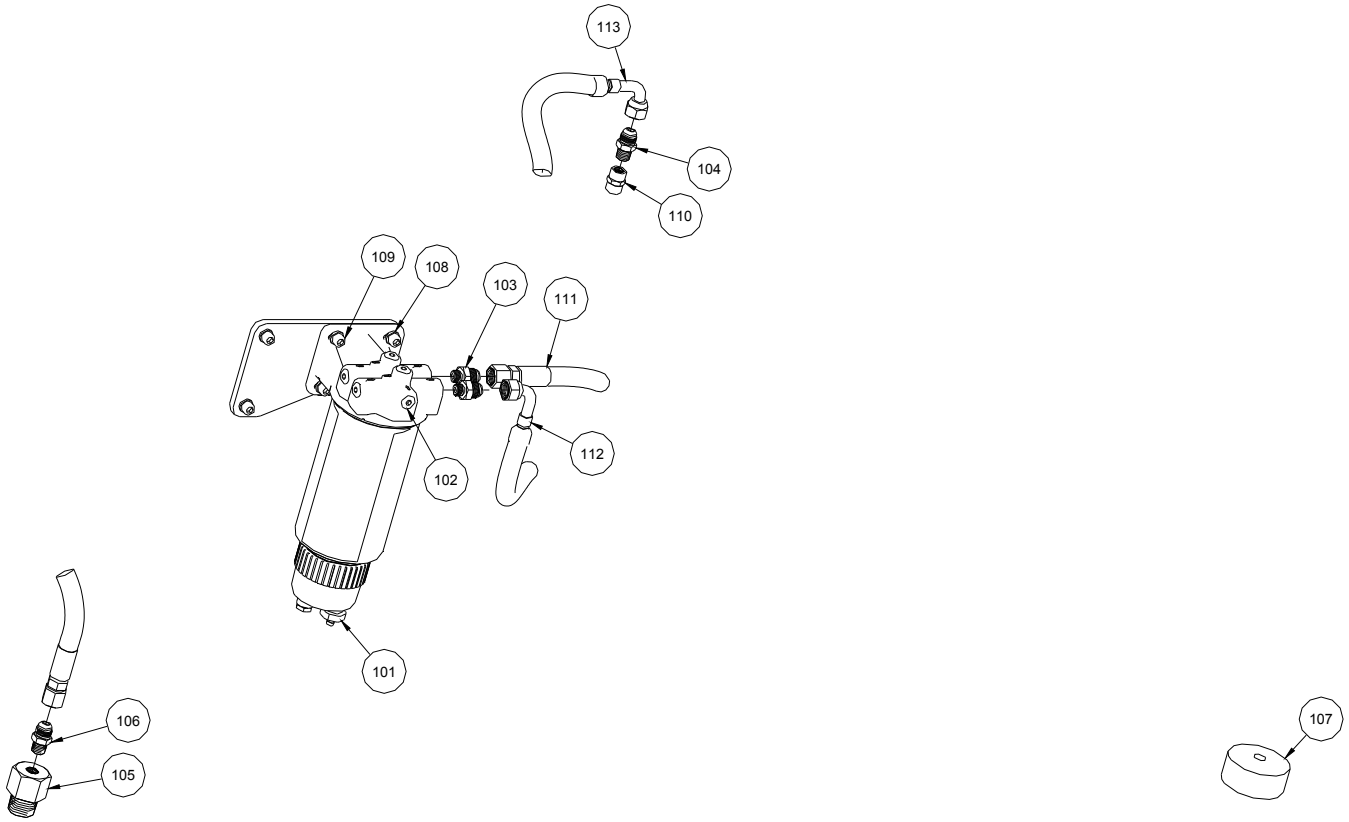
Item	Part Number	Qty	Description
101	500139	1	Load Sense Relief Body
102	750408	1	Relief Valve
103	1X8607	1	FITT2S-06M06R000-000H001
104	730921	2	FITT2L-04M04R000-000H041
105	770283	1	FITT2S-04M04R000-000H041
106	100566	1	FITT2t-04M04M04J-0000001
107	1X4	1	0.375 Flat Washer
108	1X28	1	0.375 Spring Lock Washer
109	500140	1	0.375 0.375-24UNF x 2.00 SHCS
110	510158	1	HOSE038R02J006J908L0160-0
111	510277	1	HOSE025R02J906J004L0315-0
112	510267	1	HOSE025R02J004J006L0340-0
113	510273	1	HOSE025R02J004J904L0555-0
114	510276	1	HOSE025R02J004J906L0330-0

Quick Disconnect Panel Group - Main Circuit



Item	Part Number	Qty	Description
101	750576	2	32PH Solid Flange
102	1X32	8	0.75 Spring Lock Washer
103	750420	8	0.75-10UNC x 2.25 SHCS
104	510171	2	FITT2S-24P32P000-000H001
105	140233	2	2-228 O-ring
106	731129	1	1.50 Male QD
107	731130	1	1.50 Female QD
108	400095	1	0.75 Female Disconnect
109	400121	1	0.75 Dust Plug
110	731131	1	1.50 QD Dust Cap
111	731132	1	1.50 QD Dust Plug

Fuel Group Line Group with Fuel Water Separator



840537

Item	Part Number	Qty.	Description
101	750634	1	Fuel Water Separator
102	400992	5	FITT2P-06R000000-000S001
103	1X8537	2	FITT2S-08M06R000-000H001
104	110630	1	FITT2S-08M06P000-000H001
105	110706	1	FITT2S-16P08Q000-000H001
106	1X1153	1	FITT2S-08M08P000-08M08P000-000H001
107	702017	1	FITT2C—40Q000000-0000306
108	1X28	6	0.375 Lock Washer
109	1X1782	6	0.375-16UNC X 1.00 SHCS
110	110143	1	FITT2S-06Q06Q000-000H001
111	500102	2	HOSE038R02J006J006L04125
112	500103	1	HOSE050R02J008J008L04150
113	500104	1	HOSE050R02J008J908L08100
114	100419	1	Petcock
115	1X4	3	0.375 Flat Washer

Tools

Part Number	Qty.	Description
810045	1	Set of Allen Wrenches -Includes All Wrenches Shown Below:
100655	1	1/16” Allen Wrench - Long Arm
100691	1	5/64” Allen Wrench - Long Arm
100659	1	3/32” Allen Wrench - Long Arm
100661	1	7/64” Allen Wrench - Long Arm
100663	1	1/8" Allen Wrench - Long Arm
100665	1	9/64” Allen Wrench - Long Arm
100667	1	5/32” Allen Wrench - Long Arm
100669	1	3/16” Allen Wrench - Long Arm
100671	1	7/32” Allen Wrench - Long Arm
100673	1	1/4" Allen Wrench - Long Arm
100657	1	5/16” Allen Wrench - Long Arm
100675	1	3/8" Allen Wrench - Long Arm
100677	1	7/16” Allen Wrench - Long Arm
100679	1	1/2" Allen Wrench - Long Arm
100683	1	5/8" Allen Wrench - Long Arm
100685	1	3/4" Allen Wrench - Long Arm
100687	1	7/8" Allen Wrench - Short Arm
100689	1	1" Allen Wrench - Short Arm

Recommended Spare Parts

Bulk

Part Number	Qty.	Description
810013	5 GAL	Hydraulic Fluid
810011	5 GAL	Vibrator gear case Lubricant
100726	1 GAL	Coolant/Anti-Freeze
100298	1 GAL	I C E Green Paint
100299	1 GAL	Primer

595E O-Ring Kit - 850129

Part Number	Qty	Description
100037	12	2-222 O-Ring
100097	4	2-214 O-Ring
110119	14	2-225 O-Ring
110631	1	2-117 O-Ring
140255	2	2-113 O-Ring
400379	2	2-232 O-Ring

Quick Disconnect Seal Kit - 731133

Filters

Part Number	Qty.	Description
CAT 106-3969	1	Air cleaner element-outer
CAT 106-3973	1	Air cleaner element-inner
CAT 326-1643	1	Fuel water separator
CAT 1R-0751	1	Fuel filter element
CAT 1R-0716	1	Lube oil filter element
ICE 100584	4	Hydraulic oil filter element 10 micron
ICE 935315	4	Hydraulic oil filter element 25 micron (optional)

Section 4: ELECTRICAL CIRCUITRY

Electrical Schematic

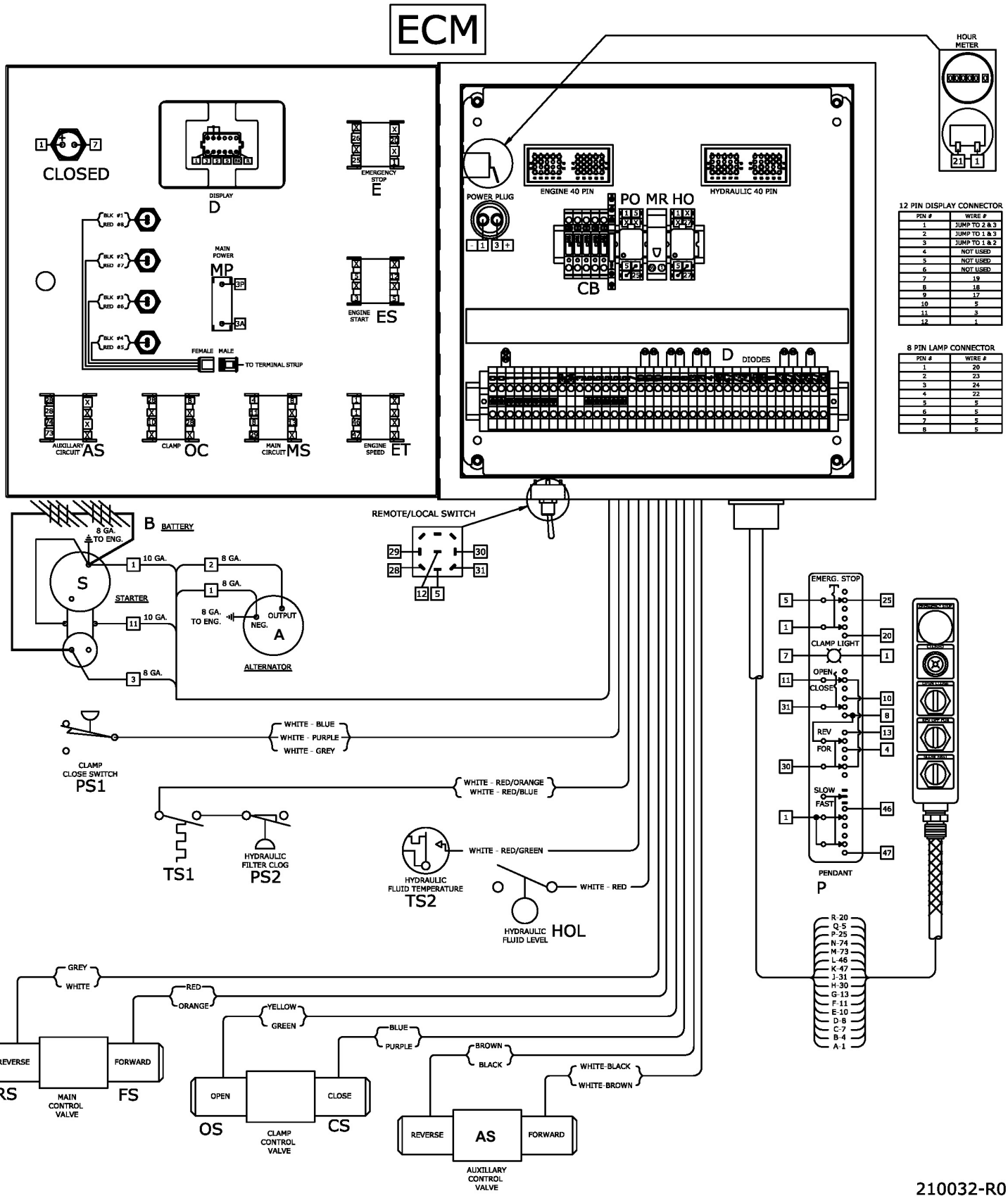
The electrical control circuitry information is for troubleshooting reference. Please refer to the power unit Operation and Maintenance manual for additional troubleshooting information.

The 595E Control system consists of a On Board Computer Module, I/O expansion module and monochrome display. The control system is packaged in a control cabinet with various switches and controls. Major components of the system are listed in the table below.

Electrical Components

Item	Part Number	Qty.	Description
A	CAT 4N3986	1	Alternator
AS	400718	1	Auxiliary Switch (Optional)
B	100529	2	Battery
CB	750503	5	10 Amp Circuit Breaker
CLOSE	100359	1	Close Light
OC	130155	1	Clamp Switch
CS	730807	1	Close Solenoid
D	750311	1	Display
E	130507	1	Emergency Stop Switch
ECP	840089	1	Electric Control Panel Assembly
ES	110615	1	Engine Start Switch
ET	100566	1	Engine Throttle Switch
FS	750026	1	Forward Solenoid
FT1	840097	1	Fuel Level Transducer Assembly
HO	731185	1	Hydraulic Override
HOL	100314	1	Hydraulic Fluid Level Switch
IM	750347	1	Input Module
MP	400141	1	Main Power
MR	731179		Maintenance Required Reset
MS	400718	1	Master Circuit Switch
OS	730807	1	Open Solenoid
P	840090	1	Pendant Control Assembly
PO	731185		Pendant Override
PS1	840477	1	Close Clamp Switch
PS2	100602	1	Hydraulic Clog Filter Switch
RPM	100566	1	Engine Throttle Control Switch
RS	750026	1	Reverse Solenoid
S	CAT 207 1564	1	Starter
TS1	510178	1	Return Filter Temperature Switch
TS2	110640		Hydraulic Oil Temperature Switch Gauge

Electrical Control Module and Connector Routing



Electrical Components and Operation

Components indicated in CAPITAL LETTERS below are shown on the Electrical Components Diagram and the Electrical Schematics.

Optional Control

Duplicate vibrator/rotary head and clamp switches are located on the CONTROL PENDANT and on the CONTROL PANEL. Turning the LOCAL-REMOTE switch on the ONBOARD COMPUTER MODULE (OCM) to REMOTE permits operation of the clamp and vibrator or rotary head from the PENDANT. Turning the LOCAL-REMOTE switch to LOCAL permits operation of the clamp and vibrator or rotary head from the CONTROL PANEL. The information below assumes operation from the PENDANT.

Engine Display

The engine DISPLAY shows the following:

At all times: Engine rpm's
Coolant temperature
Oil pressure
Battery voltage

If fault: Engine fault codes

On request: Engine hours
% Engine load

Engine Monitoring

ENGINE CONTROL MONITOR (ECM) monitors the engine for any of the following conditions:

Low fuel pressure
Low oil pressure
High inlet air temperature
High coolant temperature
Engine over speed

Starting Diesel Engine

The ENGINE BATTERIES (B) provide 24 volt current to start the diesel engine. With the MAIN POWER (MP) switch on, turning the ENGINE START SWITCH (ES) to START sends a signal to the CONTROLLER. The CONTROLLER energizes the ENGINE STARTER (S) which starts the diesel engine.

On both PENDANT and CONTROL PANEL, the MAIN CIRCUIT switch and the AUXILIARY CIRCUIT switch must be in the OFF position and the clamp (OPEN-CLOSE) switch must be in the center (neutral) position to allow engine start. If any of these switches are not in the correct position for engine start, the engine will not start.

If any of the above engine conditions are detected, the ENGINE CONTROL MONITOR (ECM) will de-rate (slow down) or shut down the diesel engine depending on the severity of the condition. The SERVICE ENGINE light on the CONTROL PANEL will be turned on.

The Hydraulic monitors the hydraulic system for any of the following conditions:

1. Clogged hydraulic return filters
2. Low hydraulic oil in reservoir
3. High hydraulic oil temperature

f the hydraulic return filters pressures exceeds 24 psi (1.6 bar), the contacts on the HIGH FILTER PRESSURE SWITCH close causing the TATTLETALE RESET to send a message through the SHUT-DOWN RELAY to the ENGINE CONTROL MONITOR (ECM). The ECM shuts down the engine and turns on the RETURN FILTER CLOG light on the CONTROL PANEL. The TATTLETALE RESET button pops out. If the hydraulic oil level gets low, the contacts on the HYDRAULIC OIL LEVEL SWITCH close causing sends a signal to the engine ECM which shuts down the engine and turns on the HYD. OIL LEVEL LOW light on the CONTROL PANEL. If the hydraulic oil temperature exceeds 160˚F (71˚C), the contacts on the HYDRAULIC OIL TEMPERATURE gauge close and send sends a signal to the engine ECM which shuts down the engine and turns on the HYD. OIL TEMP. HIGH light on the CONTROL PANEL.

Changing Engine Speed

Turning the SLOW-FAST SWITCH on the PENDANT to SLOW sends a signal to the CONTROLLER. The CONTROLLER sends a signal to the engine ECM to decreases engine rpm. Turning the SLOW-FAST SWITCH on the PENDANT to FAST increases engine rpm. The switch must be held in position for 2 seconds before engine rpm will change.

Stopping Diesel Engine

Turning the ENGINE START switch to OFF sends a signal to the CONTROLLER. The CONTROLLER sends a signal to the engine ECM to shut down the engine.

If this option is set and the engine has operated for more than 15 minutes above 185°F (82° C), when the ENGINE START switch to turned to OFF, the CONTROLLER will put the engine through a cooling and shutdown sequence (See Operating and Maintenance Manual for details). After engine stops, turn MAIN POWER switch to OFF.

Automatic Engine Shutdown

When the diesel engine is running, pressing the EMERGENCY STOP (ES) button on the PENDANT or the CONTROL PANEL sends a signal to the ENGINE CONTROL MODULE. The ECM immediately shuts down the engine and vibrator or rotary head.

Emergency Stop

The engine ECM monitors the engine for any of the following conditions:

1. Low fuel pressure
2. Low oil pressure
3. High inlet air temperature
4. High coolant temperature
5. Engine over speed

Engine Monitoring

If any of these conditions occurs, the engine ECM shuts down the engine and sends a signal to the DISPLAY.

Display Engine Monitoring

The display monitors engine functions and displays any fault functions that would cause the engine to shut down.

- Alarm acknowledgement– silences au-
- Screen display-Day Mode: black letters with white background. Night Mode
- Next screen

Hydraulic System Monitoring

A system of gauges and switches monitor and control the hydraulic system for any of the following conditions:

1. Clogged hydraulic return filters
2. Low hydraulic oil in reservoir
3. High hydraulic oil temperature

If condition #1 occurs, the RETURN FILTER CLOG light is illuminated. If condition #2 or #3 occurs, the corresponding light is lit.

Hydraulic Clamp

With the diesel engine running, turning the clamp switch (OPEN-CLOSE) on the PENDANT to CLOSE sends a signal to the CONTROLLER. The CONTROLLER energizes the CLOSE-CLAMP SOLENOID (CS) on the hydraulic CLAMP CONTROL VALVE which closes the clamp.

Clamp pressure is measured by the CLAMP PRESSURE GAUGE(GA1) .

When the pressure in the close-clamp hydraulic circuit reaches 4,800 psi (330 bar), the PRESSURE SWITCH (PS-1) de-energizes the CLOSE-CLAMP SOLENOID and turns on the on the clamp CLOSE light on the PENDANT and CONTROL PANEL. If the close-clamp pressure falls below 4,500 psi, the PRESSURE SWITCH (PS-1) re-energizes the CLOSE-CLAMP SOLENOID to rebuild clamp pressure. The CLOSE lights are turned out. When pressure returns to 4,800 psi (330 bar), the PRESSURE SWITCH (PS-1) de-energizes the CLOSE-CLAMP SOLENOID and turns on the CLOSE lights.

With the diesel engine running, holding the CLAMP SWITCH (OPEN-CLOSE) in the OPEN position sends a signal to the OPEN SOLENOID. The OPEN-CLAMP SOLENOID (OS) energizes . The clamp opens. The CLOSE lights are turned out.

Vibrator

With the diesel engine running, turning the FOR-OFF-REV switch on the PENDANT to FOR energizes the FORWARD SOLENOID (FS) on the hydraulic MAIN CONTROL VALVE. The MAIN CONTROL VALVE directs hydraulic oil to the hydraulic motors and the vibrator starts.

A mechanical relief valve and accumulator provide this function. Vibrator motor pressure is measured by the MAIN PRESSURE GAUGE (GA2) .

With the diesel engine running, turning the FOR-OFF-REV switch on the PENDANT to OFF de-energizes the FORWARD SOLENOID on the MAIN CONTROL VALVE. The vibrator stops.

Other

Low hydraulic oil level - If the hydraulic oil level in the reservoir is low, the HYDRAULIC FLUID LEVEL switch (HFL) sends a signal to the ECM CONTROLLER and the ECM stops the diesel engine and flashes the fault light on the Control Panel.

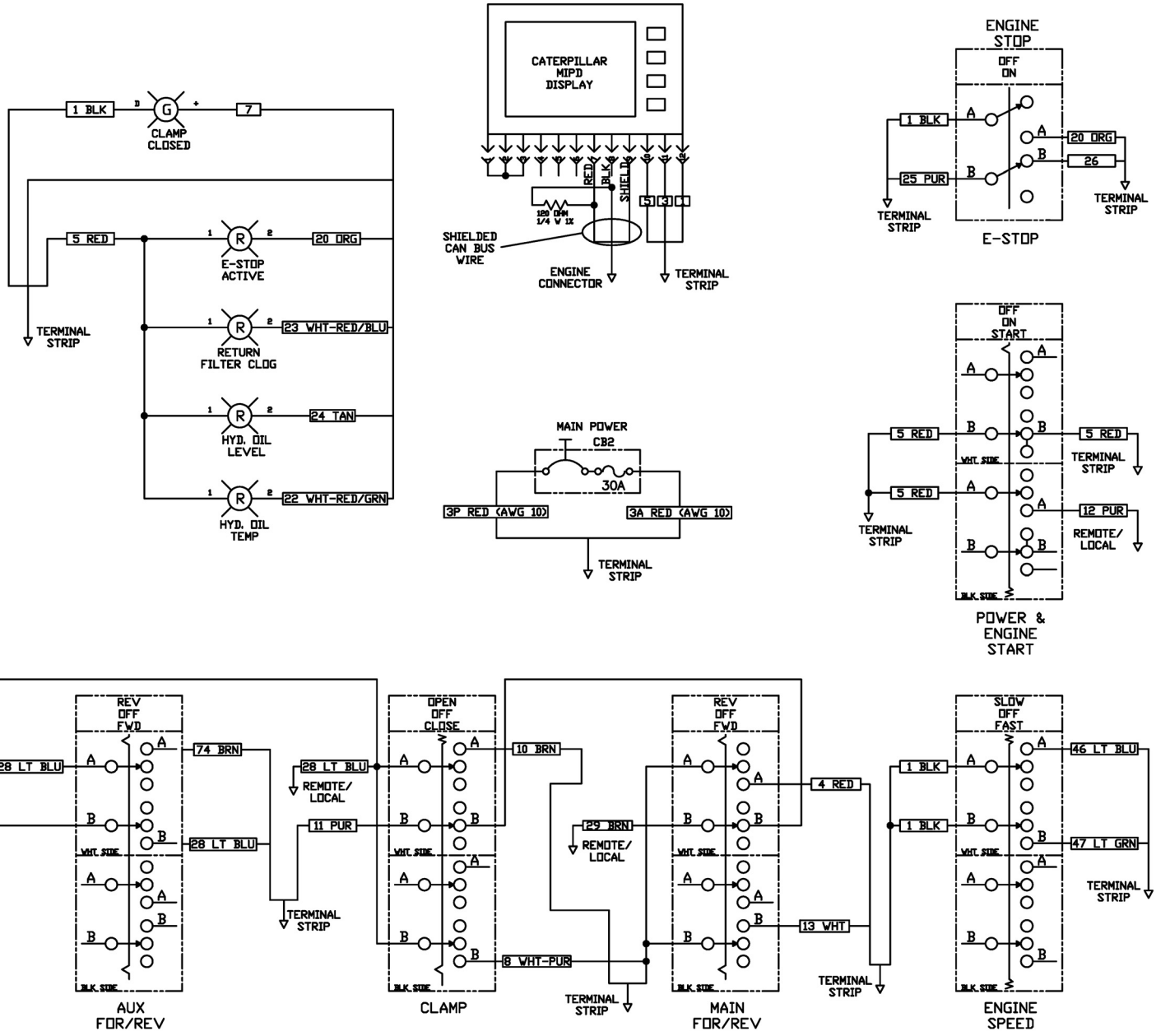
High return filter pressure - The FILTER PRESSURE GAUGE (PT3) provides pressure information for the return filters. If hydraulic oil pressure at the return filters is high, a **CLOG FILTER** light appears on the Control Panel. The TS1 temperature switch prevents a false shut down when the hydraulic oil is cold and dense. This condition creates a higher back pressure and simulates clogged return filters.

High hydraulic oil temperature - The HYDRAULIC FLUID TEMPERATURE GAUGE/SWITCH (TS2) sends temperature information at the return filters to the CONTROLLER. If hydraulic oil temperature at the return filters is high, the ECM stops the diesel engine and flashes the fault light on the DISPLAY.

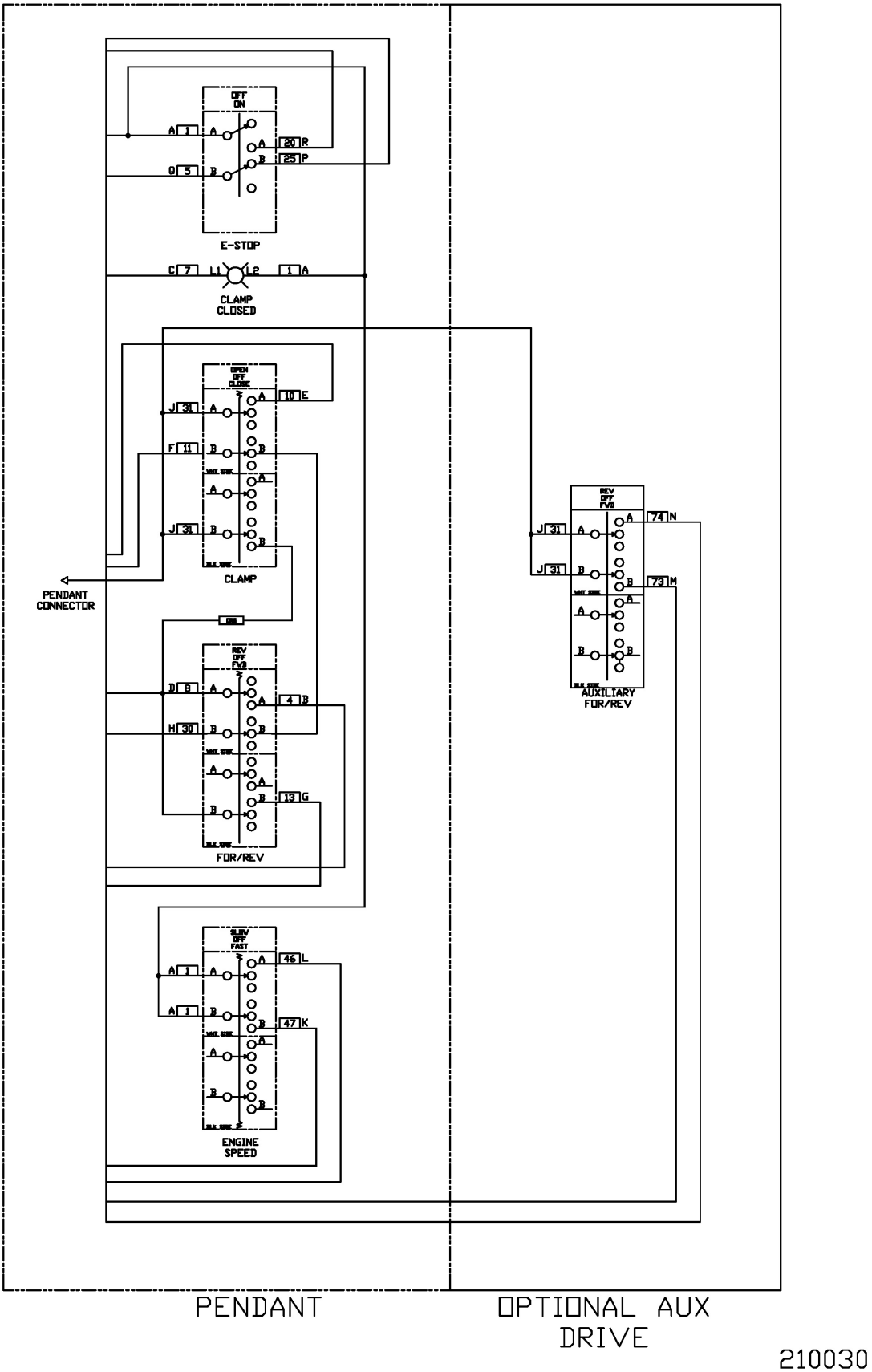
Auxiliary circuit – An AUXILIARY CIRCUIT switch (AS) is mounted on the CONTROL PANEL and wired to control an optional auxiliary power circuit.

Circuit breakers/Diodes / Relays – Five 10-amp breakers protect the ECM. The MAIN POWER switch is a circuit breaker which protects the control circuitry. Diodes (D) protect the control circuitry from reverse polarity. A Time Delay Relay inside the panel helps prevent inadvertent shut-downs from temporary conditions and provides the operator time to view gauges and the display prior to shut-down. Another relay keeps the CLOG FILTER light lit after a clog filter condition shuts down engine and pressure has dissipated in the return filter.

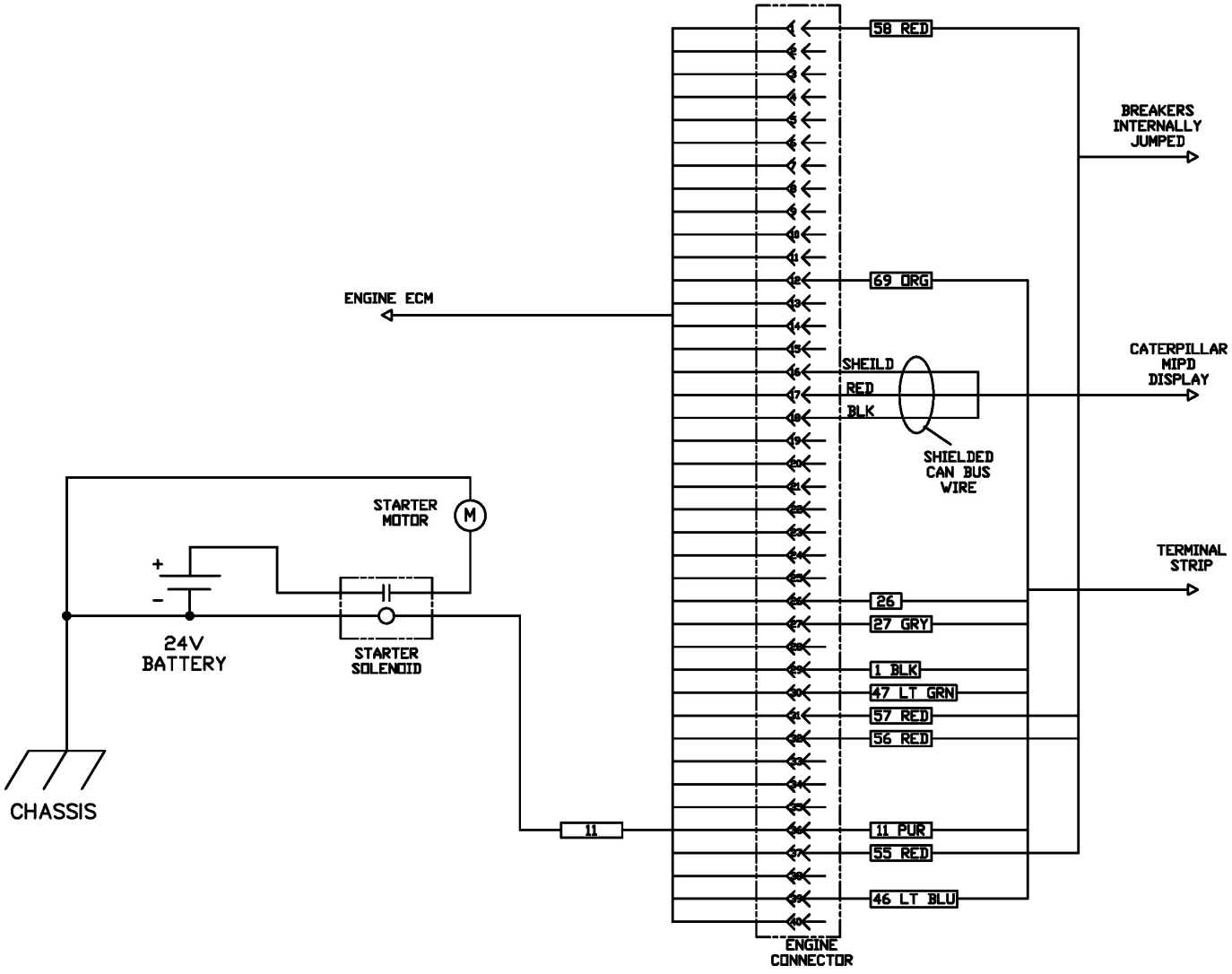
Electrical Schematic A



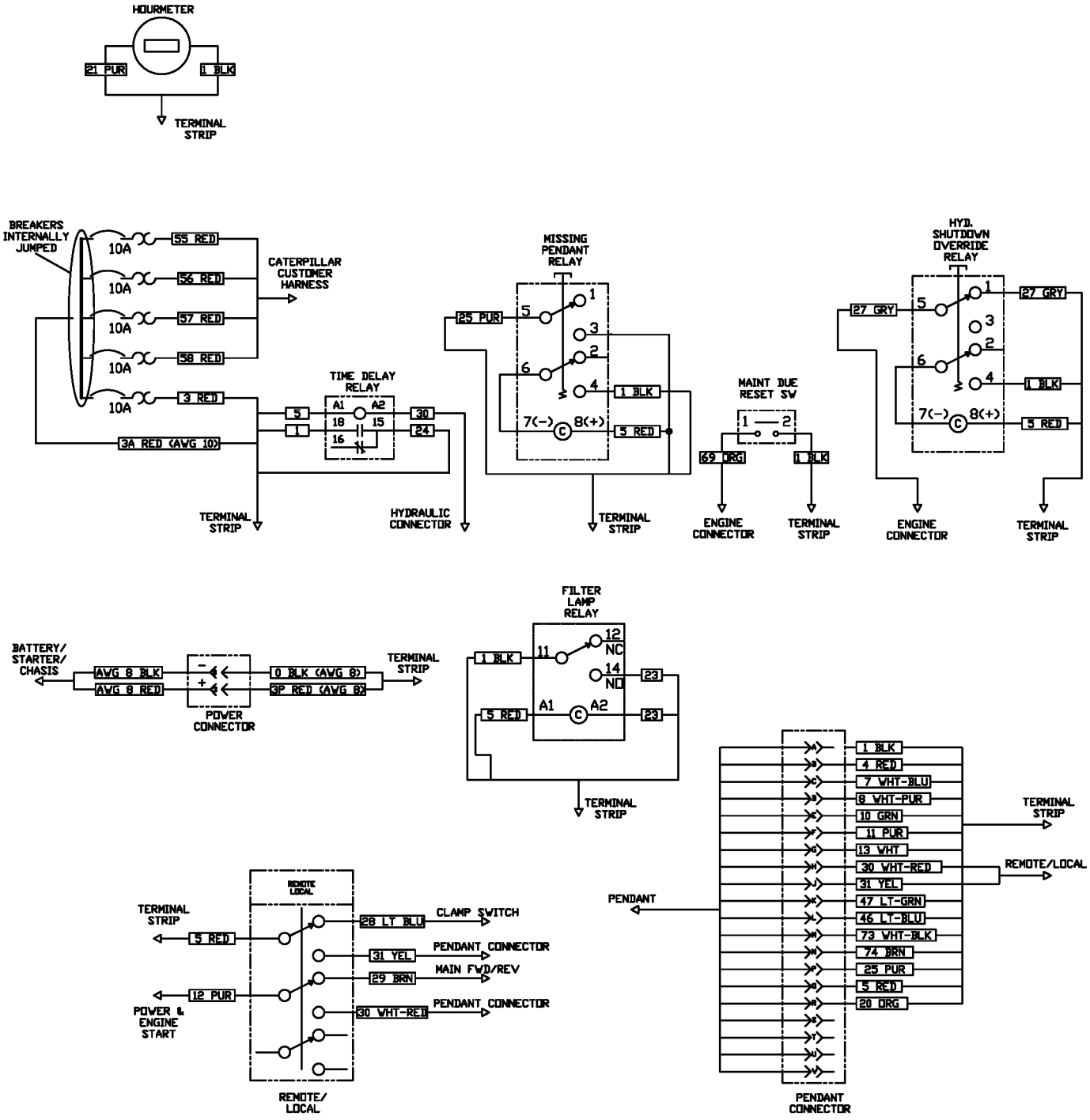
Electrical Schematic B



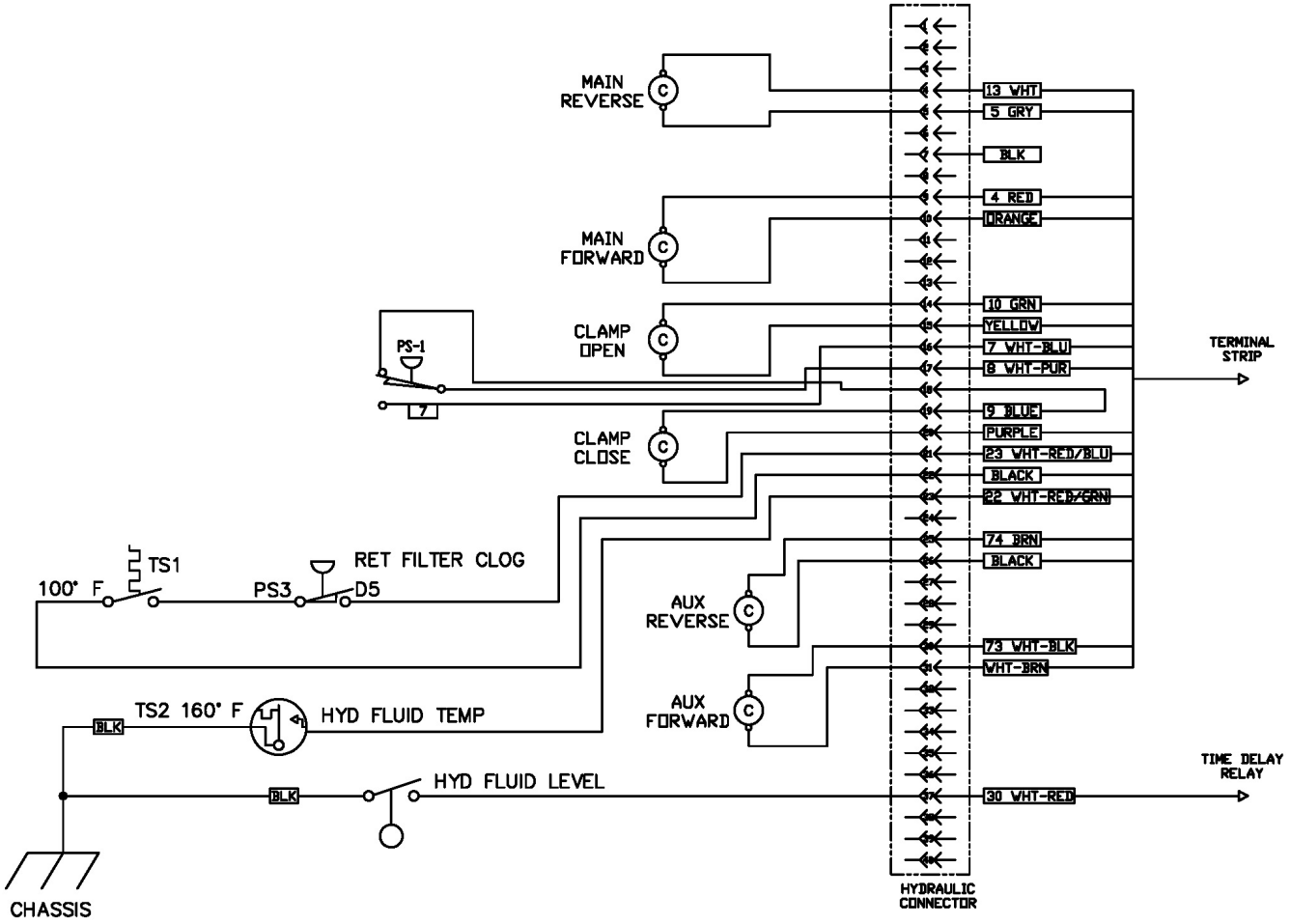
Electrical Schematic C



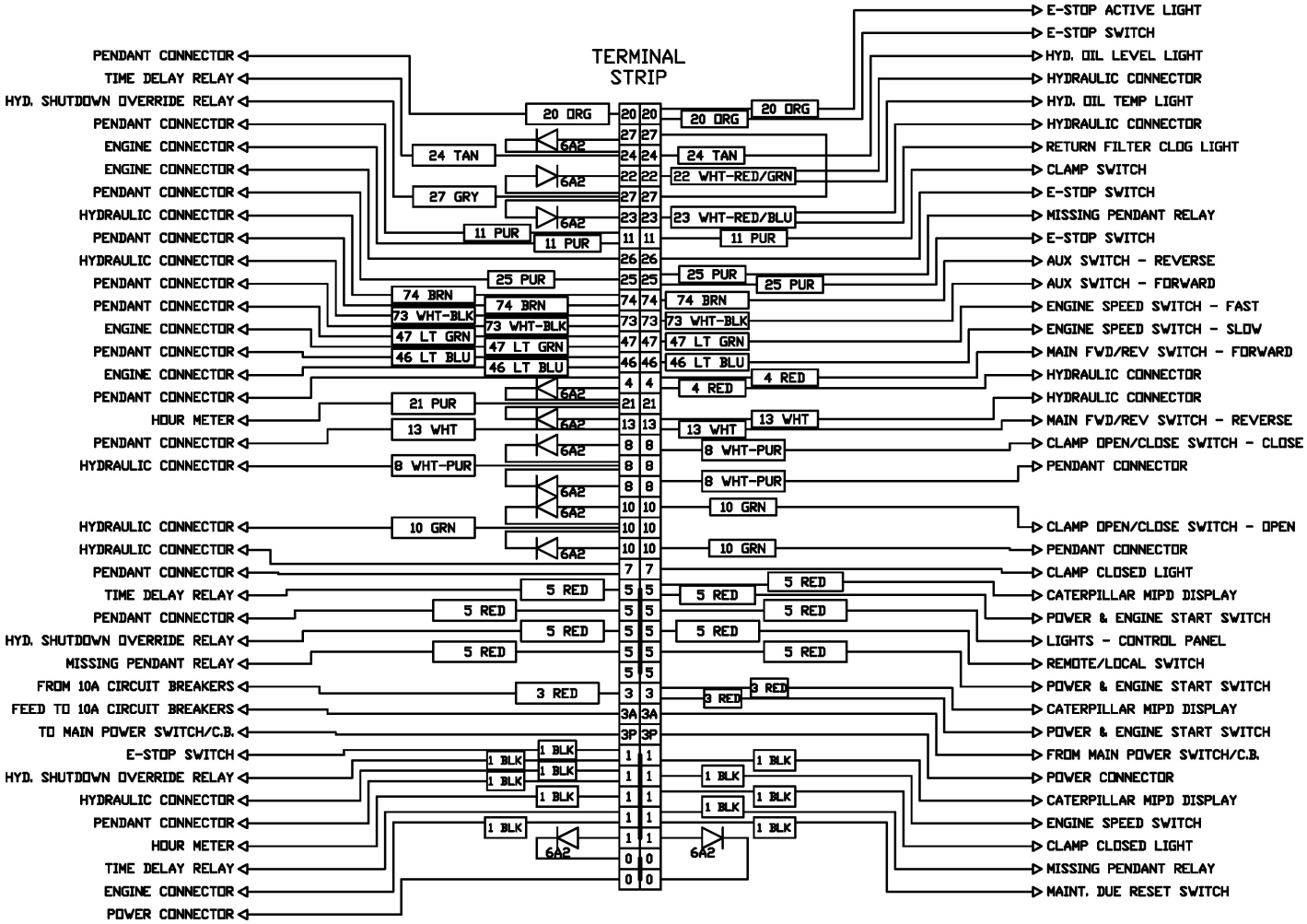
Electrical Schematic D



Electrical Schematic E



Electrical Schematic F



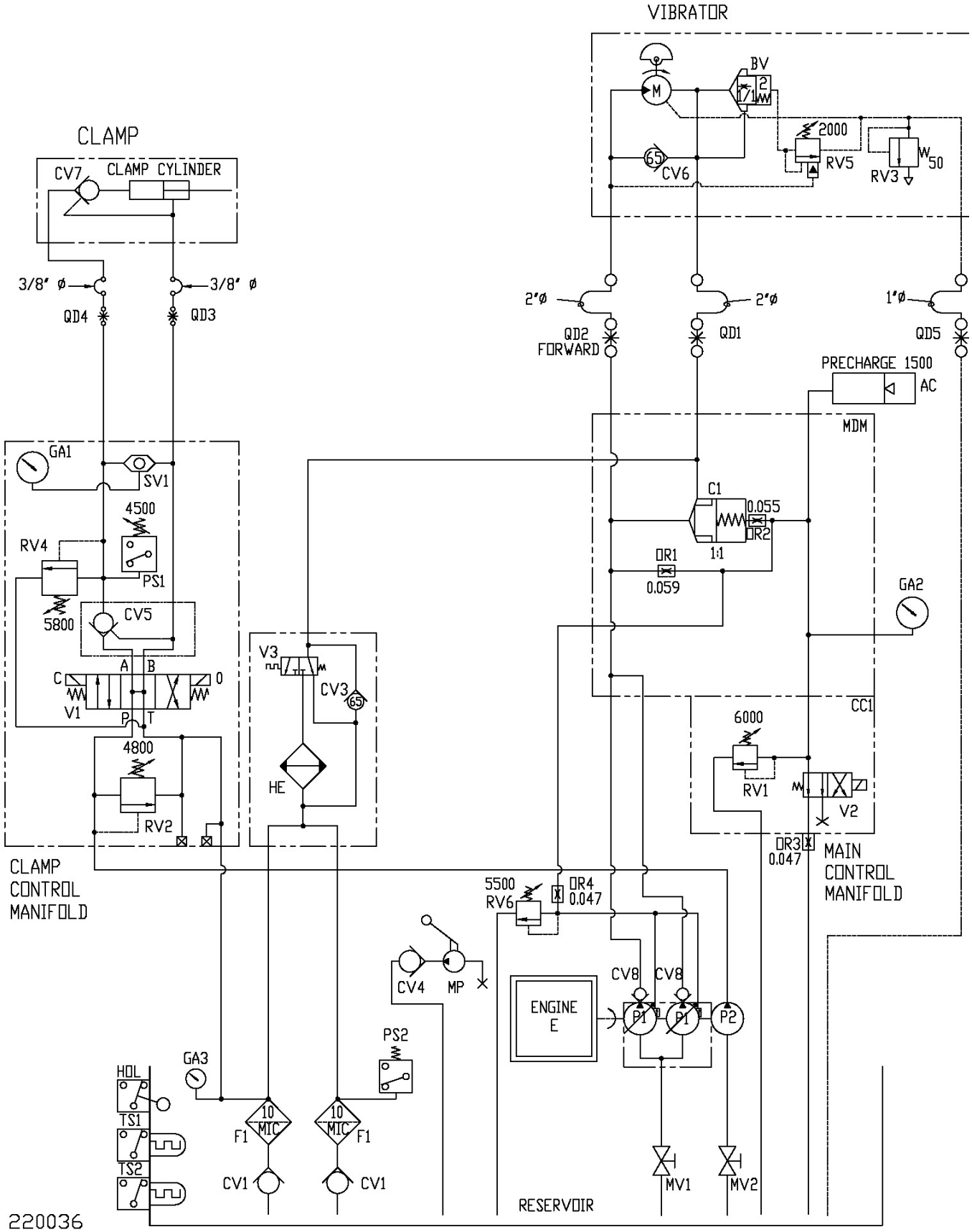
Section 5: HYDRAULIC CIRCUITRY

The hydraulic components list and schematic in this section is for trouble shooting. Please refer to the power unit Operation and Maintenance manual for additional troubleshooting information. Components noted in CAPITAL LETTERS are shown on the components list and schematic.

Hydraulic Components

ITEM	QTY.	PART NO.	DESCRIPTION
AC	1	750064	ACCUMULATOR
P1	1	510070	MAIN PUMP
P2	1	100684	CLAMP PUMP
E	1	730816-SE	ENGINE - CAT C15
CV1	1	760050	CHECK VALVE
CV3	1	NA	CHECK VALVE
CV4	1	100451	CHECK VALVE
CV5	1	760036	CHECK VALVE
CV6	1	110296	CHECK VALVE
CV7	1	120629	CHECK VALVE
CV8	2	500120	CHECK VALVE
QD1	1	100897	QUICK DISCONNECT
QD2	1	100891	QUICK DISCONNECT
QD3	1	100777	QUICK DISCONNECT
QD4	1	100245	QUICK DISCONNECT
QD5	1	400095	QUICK DISCONNECT
GA1	1	110600	PRESS GAUGE 0-7500
GA2	1	110600	PRESS GAUGE 0-7500
GA3	1	100436	PRESS GAUGE 0-60
OR1	1	760302	ORIFICE - 0.059"
OR2	1	500167	ORIFICE - 0.055"
OR3	1	770283	ORIFICE - 0.047"
OR4	1	770283	ORIFICE - 0.047"
RV1	1	750408	RELIEF VALVE
RV2	1	750408	RELIEF VALVE
RV3	1	110214	RELIEF VALVE
RV4	1	NA	RELIEF VALVE
RV5	1	731161	RELIEF VALVE
RV6	1	750408	RELIEF VALVE
SV	3	750024	SHUTTLE VALVE
V1	1	750334	SOLENOID VALVE - 24V
V2	1	750513	SOLENOID VALVE - 24V
V3	1	NA	THERMOSTATIC VALVE
MP	1	100447	MANUAL PUMP
HE	1	730230	COOLER PACKAGE
F1	1	790008	RETURN FILTER
FE	4	100584	FILTER ELEMENT
HOL	1	100314	FLOAT SWITCH - HYD
TS1	1	110640	TEMP SWITCH - HYD
TS2	1	510178	TEMP SWITCH - FILTER
PS1	1	100627	PRESS SWITCH - CLAMP
PS2	1	100602	PRESS SWITCH - FILTER
MDM	1	500156	MAIN DRIVE MANIFOLD
CC1	1	500159	COVER
C1	1	140669	POPPET - 1:1
BV	1	110622	BRAKE VALVE
MV1	1	510095	BALL VALVE
MV2	1	170433	BALL VALVE
M2	2	730214	MOTOR

Hydraulic Schematic



Hydraulic Operation

Hydraulic Clamp

With the DIESEL ENGINE (E) running, hydraulic oil is taken from the RESERVOIR by the CLAMP PUMP (P2). The clamp pump flow returns to the RESERVOIR if the clamp switch on the pendant has not been moved.

Turning the clamp switch on the control pendant to CLOSE activates the CLAMP CONTROL VALVE (V1). Hydraulic oil is directed to the close-clamp side of the hydraulic CYLINDER on the hydraulic clamp. The clamp closes. Clamping pressure is measured by the clamp transducer (PT2) and is shown on the control panel display. When clamp-ing pressure reaches approximately 4800 PSI (310 Bar), the Onboard Computer Module (OCM) deactivates the CLAMP CONTROL VALVE (V1), which directs the flow from the CLAMP PUMP to the RESERVOIR. Pres-sure at the clamp is maintained by the CLAMP CHECK VALVE (CV5). If clamping pressure falls below 4500 PSI (290 Bar), the OCM activates the CLAMP CONTROL VALVE to restore pressure. In the event of hose failure, the CLAMP HOLDING VALVE (CV7), located in the clamp cylinder, will hold the clamp cylinder closed.

Turning the clamp switch on the control pendant to OPEN activates the CLAMP CONTROL VALVE (V1). Hydraulic oil is directed to the OPEN CLAMP side of the hydraulic CYLINDER. The pressure in the open-clamp line opens the CLAMP CHECK VALVEs (CV5 and CV7). The clamp opens. Pressure in the clamping circuit is regulated CLAMP RELIEF VALVE (RV2). The quick disconnect couplers (QD3 and QD4) permit de-coupling of the clamp hoses at the power unit. The clamp circuit on all ICE power units can be configured to operate auxiliary equipment, such as spotters, pile gates, etc. contact ICE for instructions.

A TEMPERATURE RELIEF VALVE (RV4) relieves pressure in the clamp circuit caused by high ambient temperature.

Vibrator

With the diesel engine running, hydraulic oil is taken from the RESERVOIR by the MAIN PUMP (P1). If the vibrator switch REV-OFF-FOR on the control pendant is in the OFF position, oil pressure opens cartridges CA1, CB1, CA2 & CB2 in the MAIN CONTROL VALVE (V2) and vents the hydraulic oil back to the RESERVOIR through the RETURN FILTERS (F1, F2).

Turning the vibrator switch to the FOR position activates the FORWARD SOLENOID on the MAIN CONTROL VALVE. By blocking the pilot flow from cartridges CB1 and CA2, the MAIN CONTROL VALVE causes these cartridges to close, thus directing pump flow to the VIBRATOR MOTORS (M). Full motor speed is reached within a few seconds (see note below). Vibrator pressure is measured by the MAIN TRANSDUCER (PT1) and is shown on the control panel display. Maximum vibrator pressure is regulated by the FORWARD RELIEF VALVE (RV1). The FORWARD RELIEF VALVE if opened by over pressure permits a small pilot flow from cartridges CB1 and CA2. This pilot flow causes cartridges CB1 and CA2 to partially open and allows some or all of the pump flow to return to the RESERVOIR.

Oil exiting VIBRATOR MOTORS opens the BRAKE VALVE (BV2) and returns flow to the power unit. Cartridge BV2 opens easily because its pilot flow is "vented" by BRAKE COUNTER-BALANCE VALVE (BV1). The BRAKE COUNTER-BALANCE VALVE is held open by pressure coming from the motors FORWARD system.

Turning the vibrator switch on the control pendant to OFF, de-energizes the CONTROL VALVE (V2) and "vents" (open) cartridges CA1, CA2, CB2, and CB1, allowing pump flow to go directly back to the RESERVOIR.

Vibrator (continued)

When pressure is removed from the main FORWARD system, the BRAKE COUNTER-BALANCE VALVE (BV1) closes and blocks the pilot flow from BRAKE VALVE (BV2) cartridge causing the BRAKE VALVE cartridge (BV2) to close. Maximum brake pressure is limited to 2000 PSI (138 Bar) by the BRAKE COUNTER-BALANCE VALVE (BV1). This 2000 PSI (138 Bar) back pressure rapidly brakes the MOTORS (M) to a stop. Motor cavitation in the braking operation is prevented by the CHECK VALVE (CV6).

Note on starting: On vibrator start-up, a relief valve provides a gradual increase in vibrator speed. On earlier power units, this function is provided by an electrical PROPORTIONAL RELIEF VALVE (PR). On current power units, this function is provided by a mechanical relief valve and accumulator. See MAIN CONTROL VALVE parts lists for serial numbers of power units with the two start-up configurations

Hydraulic oil temperature is regulated by the COOLER VALVE (V3). When oil temperature is below 100°F (38°C), V3 directs the flow directly to the reservoir through the RETURN FILTERS (F1, F2). When oil tempera-ture exceeds 100°F (38°C), the COOLER VALVE (V3) directs flow through the HEAT EXCHANGER (HE) and then through Filters (F1, F2). Over pressurization of the HEAT EX-CHANGER is prevented by CHECK VALVE (CV3) which bypasses excess flow and limits pressure to 65 psi (4.5 bar).

The quick-disconnect couples (QD1, QD2, and QD5) permit de-coupling of the main and case drain hoses at the power unit.

Returning oil is filtered by the RETURN FILTERS (F1, F2). The return FILTER CHECK VALVES (CV1, CV2) prevent oil loss from the RESERVOIR when the filter elements are removed. RETURN FIL-TERS (F1, F2) pressure is measured by the RETURN FILTERS TRANSDUCER (PT3). If return filters pressure is too high, a message appears on the control panel display.

If the hydraulic oil level in the RESERVOIR gets low, the HYDRAULIC OIL LEVEL switch (HOL) shuts down the diesel engine.

A manual PUMP (MP) is provided to fill the hydraulic RESERVOIR. A CHECK VALVE (CV4) prevents loss of hydraulic oil back through this pump.

Temperature of the oil returning to the RESERVOIR is measured by the hydraulic oil TEMPERA-TURE TRANSDUCER (PT3) which shuts down the diesel engine if the oil temperature exceeds 160° F (71°C).

Section 6: TORQUE SPECIFICATIONS

!WARNING – Equipment! **!WARNING – Safety!**

Vibration from operation of equipment loosens bolts, nuts, and screws, Loose or broken fasteners may cause components to break away and fall resulting in injury, equipment damage or both.
Check all fasteners daily.

!WARNING – Equipment! **!WARNING – Safety!**

Mismatched, dirty, damaged, or incorrect fasteners can result in damage, malfunction, or possible injury. Make sure fasteners are correct, clean, and undamaged.

!WARNING – Equipment! **!WARNING – Safety!**

A torque wrench is strongly recommended for assembly and maintenance of ICE equipment.

Torque is measured in terms of force and distance. Force is the amount of pushing or pulling applied at the end of the lever. Distance is the length of the lever that is being used. Torque values are given in the following units: NEWTON meters (N-m), pound inches (lb-in) and pound feet (lb-ft).

Be sure to use a torque wrench that has the proper range. Torque wrenches must be used properly in order to ensure that the correct torque is applied. Always use a smooth pull for torque wrenches. Do not jerk a torque wrench. Do not use adapters that change the length of the torque wrench. For the correct use of your torque wrench, refer to the instructions that were packaged with your torque wrench.

Prior to installation of any hardware, ensure that components are in near new condition. Bolts and threads must not be worn or damaged. Threads must not have burrs or nicks. Hardware must be free of rust and corrosion. Clean reused fasteners with a noncorrosive cleaner. Lightly lubricate the threads of reused fasteners. Lightly lubricate the mating surface of the head of reused fasteners.

Note: Too much tension on the bolt will cause the bolt to be stretched beyond the point of yield. The bolt will be permanently stretched. The bolt will loosen the grip on the parts that are being fastened. If the bolt is tightened again, the bolt will break. Do not reuse bolts that have been permanently stretched.

Torque Sequence

1. Hands tighten all fasteners. Larger connections may require the use of a small hand wrench.
2. Torque all fasteners to 40% of full torque.
3. Torque all fasteners to 70% of full torque
4. Torque all fasteners to full torque by using a cross pattern. Large flanges may require additional passes.
5. Apply at least one final full torque to all fasteners in a clockwise direction until all torque is uniform. Large connections may require additional passes.

Torque Specifications (continued)

Torque values are for lubricated fasteners. Increase torque by 1/3 for dry fasteners.

UNC Screw Size	Allen Wrench Size	Standard Torque		UNF Screw Size	Allen Wrench Size	Standard Torque	
		Ft-lbs	N-m			Ft-lbs	N-m
1/4-20	3/16	10	14	1/4-28	3/16	12	16
5/16-18	1/4	22	30	5/16-24	1/4	24	32
3/8-16	5/16	38	52	3/8-24	5/16	43	58
7/16-14	3/8	61	83	7/16-20	3/8	68	92
1/2-13	3/8	93	126	1/2-20	3/8	105	142
5/8-11	1/2	179	243	5/8-18	1/2	202	274
3/4-10	5/8	317	430	3/4-16	5/8	354	480
7/8-9	3/4	511	693	7/8-14	3/4	564	765
1-8	3/4	767	1040	1-12	3/4	860	1166
1-1/4-7	7/8	1533	2078	1-1/4-12	7/8	1697	2301
1-1/2-6	1	2668	3617	1-1/2-12	1	3001	4069

Torque for Socket Head Cap Screws
Source: Fastenal/ Century

Thread Size	Standard Torque	
	N-m	ft-lb
1/4	12 ± 3	9 ± 2
5/16	25 ± 6	18 ± 4
3/8	47 ± 9	35 ± 7
7/16	70 ± 15	50 ± 11
1/2	105 ± 20	75 ± 15
9/16	160 ± 30	120 ± 22
5/8	215 ± 40	160 ± 30
3/4	370 ± 50	275 ± 37
7/8	620 ± 80	460 ± 60
1	900 ± 100	660 ± 75
1 1/8	1300 ± 150	960 ± 110
1 1/4	1800 ± 200	1320 ± 150
1 3/8	2400 ± 300	1780 ± 220
1 1/2	3100 ± 350	2280 ± 260

Torque for Grade 8 UNC Bolts & Nuts
Source: CAT SENR3130

Metric (ISO) Thread Size	Standard Torque	
	N-m	ft-lb
M6	12 ± 3	9±2
M8	28 ± 7	21 ± 5
M10	55 ± 10	41 ± 7
M12	100 ± 20	75 ± 15
M14	160 ± 30	120 ± 22
M16	240 ± 40	1 75 ± 30
M20	460 ± 60	340 ± 44
M24	800 ± 100	590 ± 75
M30	1600 ± 200	1180 ± 150
M36	2800 ± 350	2100 ± 260

Torque for Metric (ISO) Bolts & Nuts
Source: CAT SENR3130