

PARTS MANUAL FOR HALE SAM



BY

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Abbreviations And Acronyms

The abbreviations used in this manual are limited to standard (commonly used and accepted) scientific units of measure and therefore are NOT defined or listed. The acronyms used in this manual are defined in this listing (in numerical-alphabetical order) and are NOT defined within the text.

CAFS Compressed Air Foam System

CAN Controller Area Network

ESP Environmentally Safe Priming

ID Identification

ITL Indicator Tank Level (ITL-40 a Hale product)

MIV Master Intake Valve (A Hale Product)
NFPA National Fire Protection Association
OEM Original Equipment Manufacturer
OIM Operation Installation Maintenance

P/N Part Number

WI-FI Local Area Wireless Technology



1. SAFETY

This section provides definitions for DANGERS, WARNINGS, CAUTIONS and NOTES contained herein, precautions to be taken for pump repair as well as an alphabetical summary listing of the WARNINGS and CAUTIONS used in this manual.

1.1 Safety Headings

DANGERS, WARNINGS, CAUTIONS, or NOTICES that immediately precede a step apply directly to that step and all sub steps. DANGERS, WARNINGS, CAUTIONS, or NOTICES that precede an entire procedure apply to the entire procedure. DANGERS, WARNINGS, CAUTIONS, and NOTICES consist of two parts: A heading (that identifies possible result if disregarded) and a statement of the hazard (that provides the minimum precautions). NOTES are used to highlight operating or maintenance procedures, practices, conditions or statements that are not essential to protection of personnel or equipment. NOTES may precede or follow the step or procedure, depending upon the information and how it pertains to the procedure/step. The headings used and their definitions are.

ATTENTION A DANGER

INDICATES A HAZARDOUS SITUATION, WHICH IF NOT AVOIDED WILL RESULT IN SERIOUS INJURY OR DEATH.

ATTENTION A WARNING

INDICATES A HAZARDOUS SITUATION, WHICH IF NOT AVOIDED COULD RESULT IN SERIOUS INJURY OR DEATH.

ATTENTION A CAUTION

INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED MAY RESULT IN MINOR OR MODERATE INJURY.

IMPORTANT A NOTICE

ADDRESSES PRACTICES NOT RELATED TO PERSONAL INJURY.

NOTE

Highlights an essential aspect of an operating or maintenance procedure, condition, or statement and/or provides pertinent ancillary information.

1.2 Safety Summary

The following warnings and cautions are used throughout the Hale SAM manuals (and/or the items they reference) and are provided here as a safety summary.

ATTENTION A DANGER

ALL ELECTRICAL SYSTEMS HAVE THE POTENTIAL TO CAUSE SPARKS DURING SERVICE. TAKE CARE TO ELIMINATE EXPLOSIVE OR HAZARDOUS ENVIRONMENTS DURING SERVICE AND/OR REPAIR.

ATTENTION A DANGER

CHECK THE BILL OF LADING FOR THE WEIGHT BEFORE LIFTING. ONLY USE APPROPRIATE LIFT METHODS AND EQUIPMENT TO MOVE OR HANDLE SAM PUMP KIT OR MODULE. (TYPICAL PUMP KIT WEIGHT IS APPROXIMATELY 1200 LBS. (545 KG) TYPICAL MODULE WEIGHT IS 2800 LBS. (1270 KG)



ATTENTION A DANGER

ELECTRICAL POWER TO THE VALVE MOTOR SHOULD BE DISCONNECTED BEFORE OPERATING THE VALVE PHYSICALLY USING THE MANUAL OVERRIDE HANDWHEEL.

ATTENTION A DANGER

ELECTRICAL POWER TO THE VALVE MOTOR SHOULD BE DISCONNECTED BEFORE PHYSICALLY OVERRIDING ANY VALVE.

ATTENTION A DANGER

OPERATORS SHOULD FIRST BE TRAINED TO OPERATE THE FIRE PUMP MANUALLY (USING PUSH BUTTONS, CONTROL RODS, AND MANUAL [NOT ELECTRICAL] VALVE OVERRIDES.)

- AUTOMATION ONLY MITIGATES PROBLEMS AROUND THE PUMP AND VALVES
 - OPERATORS NEED TO UNDERSTAND HOW TO DIAGNOSE PROBLEMS
 - SAM MANAGES PROBLEMS BY HELPING TO KEEP THE PUMP SAFE BUT IF AN INADEQUATE WATER SUPPLY OR PUMP CAVITATION OCCURS THE OPERATOR MUST UNDERSTAND WHAT IS HAPPENING AND CORRECT THE PROBLEM
- SAM DOES NOT ADJUST FOR FRICTION LOSS ON HOSE LINES OR PUMPING AT ELEVATION
 - SAM MAINTAINS PRESSURE SETTINGS BASED ON SENSORS MEASURING PRESSURE NEAR THE DISCHARGE VALVE
 - THE SYSTEM CAN NOT ALLEVIATE STATIC PRESSURES.
 - RESIDUAL PRESSURE IN THE SYSTEM MAY BUILD IN THE DISCHARGE LINES WHEN THAT PARTICULAR LINE IS NOT FLOWING WATER OR NOT FLOWING ENOUGH WATER TO BE GATED
 - THE OPERATOR MUST BE AWARE THAT THIS PRESSURE MAY PRESENT A DANGER TO LARGER DISCHARGES. (THEREFORE, SETTING A SMALLER DISCHARGE LINE AT A PRESSURE HIGHER THAN YOU WOULD EXPOSE A LARGER HOSE [OR LARGER DISCHARGE] TO IS NOT RECOM-MENDED)

ATTENTION A WARNING

A PRESSURE HAZARD MAY EXIST EVEN WHEN THE PUMP IS NOT RUNNING. PRIOR TO REMOVING HOSES OR CAPS FROM PUMP CONNECTIONS, RELIEVE PRESSURE BY OPENING DRAINS. BLEEDER VALVES SHOULD ALSO BE USED WHEN CONNECTING TO AN INTAKE FROM A PRESSURIZED SOURCE.

ATTENTION A WARNING

ALWAYS FOLLOW LOCAL GUIDELINES FROM THE AHJ AND THE APPARATUS MANUFACTURER.

ATTENTION A WARNING

ALWAYS FOLLOW PROPER OPERATING PROCEDURES. THE PUMP OPERATOR MUST BE FAMILIAR WITH THE PUMP AND SAM OPERATING INSTRUCTIONS AS WELL AS OTHER OPERATING GUIDELINES FOR THE APPARATUS AND ACCESSORIES.



ATTENTION A WARNING

ALWAYS STOP THE ENGINE, SET THE PARKING BRAKE, AND CHOCK THE WHEELS BEFORE GOING UNDER THE TRUCK FOR ANY REASON.

ATTENTION A WARNING

AVOID CONTACT WITH HOT SURFACES. THE PACKING GLAND AND PUMP BODY MAY PRESENT A TEMPERATURE HAZARD. OVERHEATING MAY RESULT IN A SCALDING WATER HAZARD.

ATTENTION A WARNING

DO NOT EXCEED OPERATING PRESSURE LIMITS OF PUMP, INSTALLED PLUMBING, HOSE(S), OR EQUIPMENT IN USE.

HOSE FAILURE CAN RESULT IF A HOSE IS EXPOSED TO EXCESSIVE PRESSURE.

ATTENTION A WARNING

OPERATORS, INSTALLERS, AND MAINTENANCE PERSONNEL MUST BE TRAINED AND QUALIFIED FOR ALL THE ACTIVITIES THEY PERFORM.

ATTENTION A WARNING

NOT ALL GLOVES ALLOW THE SAM TOUCHSCREENS TO FUNCTION. TEST GLOVES ON ALL OF THE SAM TOUCHSCREENS PRIOR TO OPERATING SAM. DO NOT WEAR GLOVES THAT PREVENT THE TOUCHSCREENS FROM OPERATING.

ATTENTION A WARNING

SAM TOUCHSCREENS DO NOT FUNCTION IF COMPLETELY COVERED AND/OR IMMERSED IN WATER. DO NOT ALLOW THE TOUCHSCREENS TO BE COMPLETELY COVERED/IMMERSED WITH WATER (OR ANY LIQUID). DRY THE SCREEN TO RESTORE FUNCTIONALITY.

ATTENTION A WARNING

THE PROCEDURES IN THIS SECTION PROVIDE ONLY GENERAL AND MINIMAL INSTRUCTION. DO NOT REPLACE LOCAL PROCEDURES OR POLICIES OR RECOMMENDATIONS AND PROCEDURES PROVIDED IN THE APPARATUS/TRUCK/UNIT MANUAL WITH THESE PROCEDURES.

THE PROCEDURES IN THIS SECTION ARE GENERAL OPERATING PROCEDURES BASED ONLY ON HALE EQUIPMENT. NOT ALL PROCEDURES IN THIS SECTION MAY APPLY TO YOUR SPECIFIC OPERATIONAL REQUIREMENTS OR APPARATUS CONFIGURATION. REFER TO ONLY THE INFORMATION/PROCEDURES WHICH APPLY TO YOUR OPERATIONAL REQUIREMENTS AND ONLY WHEN LOCAL PROCEDURES, POLICIES, OR GUIDELINES ESTABLISHED BY THE AHJ DO NOT EXIST.

ALWAYS REFER TO THE PROCEDURES PROVIDED BY THE AHJ FOR SETTING WHEEL CHOCKS AS WELL AS LAYOUT AND CONNECTION OF HOSES, VALVES AND DRAINS.

ATTENTION A WARNING

THE TABLET COMMUNICATES THROUGH THE SAM CONTROL CENTER LOCATED IN THE OPERATORS PANEL, IF THAT SCREEN FAILS, THE TABLET WILL NOT CONTROL THE APPARATUS.



ATTENTION A CAUTION

SHIPPING CONTAINERS WEIGHS VARY WIDELY FOR SAM COMPONENTS. ALWAYS CHECK THE SHIPPING INFORMATION FOR EACH CONTAINERS WEIGHT AND USE THE APPROPRIATE LIFTING METHOD AND/OR WEIGHT RATED EQUIPMENT.

ATTENTION A CAUTION

REMOVE SYSTEM PRESSURE BEFORE PERFORMING CALIBRATION. OPEN ALL DRAINS AND AIR BLEED VALVES TO ENSURE THE SYSTEM IS NOT PRESSURIZED AND THE VALVE(S) CAN BE OPENED AND CLOSED SAFELY BEFORE PROCEEDING WITH VALVE CALIBRATION.

ATTENTION A CAUTION

VALVES OPERATE AUTOMATICALLY. REMOVE POWER BEFORE OVERRIDE

IMPORTANT A NOTICE

ACTIVATING FOAM OFF FROM THE SAM CONTROL CENTER TURNS OFF THE SMART-FOAM SYSTEM, TURNING OFF FOAM TO ALL FOAM CAPABLE DISCHARGES, HOWEVER, THE DISCHARGE(S) ARE NOT CLOSED AND CONTINUE TO FLOW WATER ONLY.

IMPORTANT ▲ NOTICE

AHJ MUST INSURE PROPER TRAINING IS IN PLACE FOR ALL OPERATORS. THIS QUICK START GUIDE DOES NOT REPLACE OR SUPERSEDE THE OPERATION INSTALLATION MAINTENANCE MANUAL OR PROPER TRAINING.

IMPORTANT A NOTICE

AKRON BRASS SWING-OUTTM VALVES FROM A DISCHARGE PORT WILL NOT FUNCTION IN THE PLACE OF ANY SPECIAL PURPOSE VALVE (TF, T2P, PONY) IN A HALE SAM SYSTEM. DO NOT USE ONE FOR SUBSTITUTION OR REPLACEMENT PURPOSES.

IMPORTANT A NOTICE

ALL SAM TOUCHSCREENS ARE WATER RESISTANT.

IMPORTANT A NOTICE

ALL SAM TOUCHSCREENS FUNCTION BETTER IF TOUCHED USING THE PAD PORTION OF THE FINGER WHILE WEARING GLOVES. THE TOUCHSCREENS OFTEN DO NOT FUNCTION WHEN TOUCHED USING THE SEAM PORTION OF A GLOVE.

IMPORTANT A NOTICE

ALTHOUGH SMARTFOAM AND SMARTCAFS BOTH UTILIZE THE FOAM LABEL, A FOAM LABELED DISCHARGE BUTTON DOES NOT OPERATE THE SAME WAY ON SAM FOR BOTH SYSTEMS.

IMPORTANT A NOTICE

ALWAYS DISCONNECT THE POWER CABLE, GROUND STRAPS, ELECTRICAL WIRES AND CABLES FROM THE CONTROL UNIT OR OTHER HALE SAM EQUIPMENT BEFORE ELECTRIC ARC WELDING AT ANY POINT ON THE APPARATUS.

IMPORTANT ▲ NOTICE

ALWAYS TURN OFF CAFS FROM THE SMARTCAFS CONTROL DISPLAY.



IMPORTANT A NOTICE

AN ACCURATE FLOW MEASURING DEVICE MUST BE USED TO MEASURE THE WATER FLOW WHEN CALIBRATING THE FLOW SENSOR. USE A SUITABLE SIZE, SMOOTH BORE NOZZLE AND AN ACCURATE AND CALIBRATED PITOT GAUGE INSTRUMENT OR MASTER FLOW METER. HAND HELD PITOT GAUGES ARE USUALLY NOT VERY ACCURATE. MAKE SURE THE SYSTEM IS CALIBRATED WITH AN ACCURATE FLOW MEASURING DEVICE.

IMPORTANT ▲ NOTICE

AN OFF-THE-SHELF AKRON BRASS SWING-OUT™ VALVE WILL NOT FUNCTION IN A HALE SAM SYSTEM. DO NOT USE ONE FOR SUBSTITUTION OR REPLACEMENT PURPOSES.

IMPORTANT A NOTICE

DISCONNECT ELECTRICAL POWER TO THE VALVE MOTOR WHEN USING THE OVERRIDE TO OPERATE THE VALVE DIRECTLY.

IMPORTANT A NOTICE

DO NOT ALTER THE CAN NETWORK COMMUNICATIONS (SAE J1939 CAN BUS) OR CONNECT OTHER DEVICES TO ANY OF THE CAFS, CAPTIUM, FOAM, OR SAM CAN BUS BACKBONE(S).

IMPORTANT A NOTICE

DO NOT HARD SHUTDOWN THE TABLET (POWER OFF BY HOLDING THE POWER BUTTON FOR LONGER THAN 5 SECONDS). A HARD SHUTDOWN MAY CORRUPT THE OPERATING SYSTEM, MAKING THE TABLET UNUSABLE.

IMPORTANT A NOTICE

DO NOT RUN THE PRIMER FOR MORE THAN 45 SECONDS. IF PRIME IS NOT ACHIEVED IN 30 - 45 SECONDS. STOP AND LOOK FOR AIR LEAKS OR BLOCKED SUCTION HOSE.

IMPORTANT A NOTICE

EXCESSIVE PRESSURE LOSS MAY OCCUR IF THE DRIP RATE IS GREATER THAN AN INDIVIDUAL DRIP (A STEADY STREAM OF WATER) OR DRIP RATE EXCEEDS ONE DRIP EVERY 0.6 SECOND. THIS CONDITION DEGRADES PUMP PERFORMANCE.

IMPORTANT A NOTICE

HALE MIDSHIP PUMPS ARE SHIPPED WITHOUT GEAR OIL. FILL THE GEARBOX WITH GEAR OIL SPECIFIED IN PARAGRAPH 7.4.2, RECOMMENDED GEARBOX LUBRICANTS, OF FSG-MNL-00199, OIM MANUAL FOR HALE MIDSHIP PUMPS, BEFORE OPERATING.

IMPORTANT A NOTICE

IF THE DISCHARGE DOES NOT ACTIVATE VERIFY THE CAFS SYSTEM PRESETS (PRESET 1 FOR CAFS, PRESET 7 FOR FOAM ONLY ON THE SMARTCAFS DISPLAY) CONFIGURATION MATCHES THE SAM CONFIGURATION. (SAM WILL ONLY ACTIVATE MATCHING CONFIGURATIONS—WET, MED, OR DRY.) IF THE CONFIGURATIONS DO NOT MATCH, OPERATE SAM MANUALLY TO OPEN THE VALVE USING THE SAM CONTROL CENTER. THEN OPERATE THE CAFS SYSTEM FROM THE SMARTCAFS DISPLAY.

IMPORTANT A NOTICE

IF THE TABLET-TO-SAM WI-FI CONNECTION IS LOST, RETURN TO A SAM CONTROL CENTER ON THE APPARATUS TO RESUME CONTROL FROM A SAM CONTROL CENTER ON THE APPARATUS.



IMPORTANT A NOTICE

KEEP ALL I/O PORT COVERS IN PLACE DURING USE TO PREVENT WATER DAMAGE.

IMPORTANT A NOTICE

OTHER ELECTRICAL COMPONENTS MUST NOT BE SUPPLIED FROM THE SAM SYSTEM SUPPLY. DO NOT CONNECT THE PRIMER AND HALE SAM TO THE SAME POWER WIRE.

IMPORTANT A NOTICE

ONLY TOUCH THE SCREEN IN ONE PLACE AT A TIME. THE TOUCHSCREENS DO NOT SUPPORT MULTI-TOUCH.

IMPORTANT A NOTICE

PERFORMING THIS PROCEDURE CAUSES SAM TO EXIT AUTO MODE.

IMPORTANT A NOTICE

PUMP SEAL/PUMP SHAFT DAMAGE MAY OCCUR IF DRIP RATE IS LESS THAN ONCE EVERY 6 SECONDS. THIS CONDITION DEGRADES PUMP PERFORMANCE.

IMPORTANT A NOTICE

SOME WATER ONLY OPERATIONS MAY DAMAGE THE CAFS SYSTEM IF THE CLUTCH IS ENGAGED. REFERENCE CAFS QUICKSTART GUIDE, DISENGAGING THE COMPRESSOR CLUTCH (PAGE 10 OF FSG-MNL-00176) TO ENSURE PROPER CAFS TURN OFF WHEN SAM INCLUDES A CAFS SYSTEM.

IMPORTANT ▲ NOTICE

THE CONTROLLER UNIT DEUTSCH CONNECTORS ARE KEYED TO PREVENT INTER-CHANGE OR REVERSE DIRECTION INSERTION. DO NOT FORCE A CONNECTOR WITH-OUT FIRST VERIFYING THE CONNECTORS ORIENTATION AND PLACEMENT.

IMPORTANT A NOTICE

THE SAM CONTROL CENTER WILL NOT FUNCTION PROPERLY WITHOUT ONE OF THE DISPLAYS CONFIGURED AS THE MASTER.

IMPORTANT A NOTICE

THE STYLE 9327 NAVIGATOR MINI VALVE CONTROLLER DOES NOT SUPPORT PRESSURE INDICATION. DO NOT USE A STYLE 9327 NAVIGATOR MINI VALVE CONTROLLER FOR DISCHARGE VALVE PURPOSES OR CALIBRATIONS.

IMPORTANT ▲ NOTICE

TOUCH ONLY THE SPECIFIED BUTTON(S). FAILURE TO PERFORM THIS PROCEDURE CORRECTLY MAY CAUSE SAM TO BECOME INOPERATIVE.

IMPORTANT A NOTICE

WHEN CLOSING AN INTAKE IN MANUAL MODE, ENSURE THE PUMP HAS AN ADEQUATE WATER SUPPLY TO PREVENT OVERHEATING.

IMPORTANT A NOTICE

WHILE SAM CAN REDUCE PUMP OPERATOR WORKLOAD, IT DOES NOT TAKE THE PLACE OF THE PUMP OPERATOR. THE PUMP OPERATOR STILL NEEDS TO CALCULATE THE REQUIRED LINE PRESSURE TO SUPPORT THE HOSE LAY AND NOZZLE IN USE. SAM WILL MAINTAIN THE SET PRESSURE IN AUTO MODE.



2. SAM ILLUSTRATED BREAKDOWNS

All Hale SAM system and associated pump drawings are available on the memory stick (flash drive) provided with the pump and on the Hale Products website (https://www.haleproducts.com).

The Hale SAM system and associated pump drawings provide the information required to install, maintain, and repair SAM and the associated Hale pump. Additionally, the drawings provide information about the available Hale options for the associated pump. The following paragraphs organize SAM and each associated pumps data into sections applicable to that pump.

To locate a part number from a referenced drawing, match the items name in the DESCRIPTION column and then note/record the associated part number from the adjacent PART NUMBER column. On some drawings the PART NUMBER column references a lookup table. A lookup table is used when multiple part numbers apply for the same item.(Typically due to multiple valve sizes being available for the Customer to choose from, i.e. tank fill, tank-to-pump, or auxiliary intake valves.)

Reference the SAM OIM (FSG-MNL-00210) when local procedures do NOT exist. The OIM provides basics of SAM and SAM operation, installation verification, preventive maintenance, and operator-based troubleshooting. Refer to the SAM Technical Manual (FSG-MNL-00211) for additional installation information, preventive maintenance instruction, remove and replace instructions, and system troubleshooting.

In addition to the SAM manuals, the manuals for the associated Hale pump will be required to operate and maintain the entire system. Additional information such as Q Series midship pump specifications, ratings, and Hale Bulletin 650, Hale Foam Proportioning System Foam Concentrate Compatibility, can be found on the Hale website (www.haleproducts.com) or on the flash drive provided with the system.

When SAM includes an optional SmartFOAM or SmartCAFS, the manuals for the applicable foam system will also be required to operate and maintain the entire system.

2.1 SAM Numbering and Specifications References

SAM system only comes as part of a Hale pump kit or a Hale module and is therefore identified by the associated pump ID plate. Figure 1 shows the typical ID plate used on the Hale SAM.



Figure 1. Hale ID Tag With Sample Markings



The ID plate is stamped with the appropriate model, capacity (NFPA rated) code, drive unit code, and serial number at the factory during manufacturing/testing. (Refer to the Pump Identification paragraph in the OIM Manual for the applicable Hale pump information.) The pump ID plate is permanently attached to the associated Hale built pump module if the pump was ordered as part of a Hale built module, otherwise it is shipped loose with the SAM pump kit.

NOTE

Using your pumps serial number and the Hale website (or calling Customer Service) is the best way to ensure you receive/utilize the correct replacement parts for your pump and SAM system.

2.2 SAM Pump Kits And Modules

Hale provides SAM systems in three forms: As a pump kit with loose valves, as a pump kit with installed valves, and as a Hale built module. Refer to FSG-MNL-00210, Operation Installation Maintenance Manual For Hale SAM, Section 5, INSTALLATION paragraph, for a detailed description of each form of SAM. Each of the forms content is very similar and therefore, are NOT addressed separately herein. (Modules, additionally, contain plumbing and ancillary systems that are NOT part of SAM and are NOT covered herein.)

2.2.1 Discharge/Intake To Port Cross Reference (Valve Positions)

Refer to the QMAX PORT DIAGRAM (FSG-PL-01509) or QMAX-XS PUMP ASSEMBLY (FSG-PL-01510) for port diagram information to cross reference the intake and/or discharge (Friendly Name) being replaced. The drawings can be found on the flash drive provided with the system or on the Hale website (www.haleproducts.com).

2.2.2 General Information For SAM Akron Brass Swing-Out™ Valves

The primary pump mounted SAM components are Akron Brass Swing-Out™ valves, Hale Products modules, and Hale Products master intake valves. The Akron Brass Swing-Out™ valves are used for both intake (auxiliary [Pony] and special purpose vales [tank fill and tank-to-pump]) and discharge purposes.

The special purpose/intake valves are NOT interchangeable with each other or with discharge locations. Replacement special purpose vales can ONLY be used for their designed function.

Refer to FSG-MNL-00211, Technical Manual For Hale SAM, for troubleshooting information.

IMPORTANT ▲ NOTICE

AN OFF-THE-SHELF AKRON BRASS SWING-OUT™ VALVE WILL NOT FUNCTION IN A HALE SAM SYSTEM. DO NOT USE ONE FOR SUBSTITUTION OR REPLACEMENT PURPOSES.

IMPORTANT ▲ NOTICE

AKRON BRASS SWING-OUT™ VALVES FROM A DISCHARGE PORT WILL NOT FUNCTION IN THE PLACE OF ANY SPECIAL PURPOSE VALVE (TF, T2P, PONY) IN A HALE SAM SYSTEM. DO NOT USE ONE FOR SUBSTITUTION OR REPLACEMENT PURPOSES.

It is important to note that the valve stores the user specific Friendly Name, discharge Color assignment, calibration information (pressure/flow), and additional configuration information. Refer to the Technical Manual For Hale SAM (FSG-MNL-00211), for detailed removal and replacement information and procedures for configuring a specific Akron Brass Swing-Out™ valve. This makes providing the Hale ID tag information extremely important when ordering a replacement valve for a SAM system.



2.2.2.1 Installation

Refer to the following Akron Brass documents for general installation information and especially if valve assembly clocking is required.

- 109896, Akron Swing-Out[™] Valve Installation And Operating Instructions (Gen 1)
- 117113, 8600 Series Electric Actuator Installation Instructions (Gen 1)
- 123248, Style 8600 Electric Actuator With Motor Driver Installation Instructions (Gen 1)

Refer to FSG-MNL-00211, Technical Manual For Hale SAM, for references to removal and replacement information and procedures for configuring a specific Akron Brass Swing-Out™ valve (Gen 1 or Gen 2).

2.2.2.2 Repair Part Kits

To repair/rebuild the physical valve portion of a Gen 1 Akron Brass Swing-Out™ valve, refer to 109896, Akron Swing-Out™ Valve Installation And Operating Instructions, Field Service Kits paragraph. To repair/rebuild the physical valve portion of a Gen 2 Akron Brass Swing-Out™ valve, refer to the following Akron Brass documents:

- 109905, Style 8620-8635 And 8920-8935 Generation II Swing Out Valve With Electric Actuator
- 118883, Style 8804 Field Service Kit with Metal Ball for: 8815 Swing-Out™ Valve Conversion Kit for: 7615 and 7815 Swing-Out Valve
- 127890, Style 8600 Electric Actuator Installation Instructions
- 127891, Technical Service Parts
- 127903, Technical Service Parts

A composite ball kit is NOT recommended; however, they may be used to rebuild an Akron Brass Swing-Out™ valve on a SAM system.

Refer to FSG-MNL-00211, Technical Manual For Hale SAM, for references to torque specifications, removal and replacement information and procedures for configuring a specific Akron Brass Swing-Out™ valve (Gen 1 or Gen 2).

2.2.2.3 Replacement Valves

Refer to FSG-PL-01508, REPLACEMENT SAM VALVE for the replacement Akron Brass Swing-Out™ valve part numbers for a SAM system.

Be sure to complete the REQUIRED REPLACEMENT VALVE INFORMATION table and provide a completed table for each replacement valve required.



2.3 Component To Drawing Cross-Reference

NOTE

Drawing revision is critical to obtaining correct/current data as superseded drawings are obsoleted when the newest revision is released.

Table 1 provides an alphabetically ordered list of all major SAM components (column 1). When a SAM component is used for multiple functions within the SAM system, an indentured (right-hand justified text in column 1) follows the common component name. For each SAM component/functional name there are three associated columns: Plate/Drawings (column 2) which provides a drawing number (or numbers), Sheet (column 3) which provides the sheet number (or numbers) (from the column 2 drawing), and Content (column 4) which provides that drawing/sheet content as one (or as many as applies) of the following category.

- Connection
- Identification
- Location
- Part Numbers

Table 1. Component To Drawing Cross-Reference

Component/Item	Plate/Drawing	Sheet	Content
4-Way Air Valve	FSG-PL-01501	1 and 5	Location (General)
(Part of Priming Feature Block Assy.)	FSG-PL-01502	1 and 5	Location (General)
	538-00099-000	1	Location (Detail) Identification Part Numbers
		2	Connection
Anode	FSG-PL-01501	1 and 8	Location Identification Connection Part Numbers
	FSG-PL-01502	1 and 8	Location Identification Connection Part Numbers
Barometer Sensor	FSG-PL-01501	1 and 7	Location Identification Connection Part Numbers
	FSG-PL-01502	1 and 7	Location Identification Connection Part Numbers
Bus Termination Resister (Female) (Male)	FSG-PL-01504 (See NOTE 3 for part numbers.)	1	Location Identification Connection Part Numbers



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item	Plate/Drawing	Sheet	Content
Buzzer	FSG-PL-01501	2	Location (General)
	FSG-PL-01502	2	Location (General)
	FSG-PL-01503	17	Connector Part Numbers
	FSG-PL-01505	2	Identification Connection Part Numbers
Check Valve (Air Bleed Solenoid)	FSG-PL-01501	6 and 7	Location Identification Connection Part Numbers
	FSG-PL-01502	6 and 7	Location Identification Connection Part Numbers
Check Valve (Tank Fill)	FSG-PL-01501	8	Location Identification Connection Part Numbers
	FSG-PL-01502	80	Location Identification Connection Part Numbers
Check Valve (Quick Prime Solenoid)	FSG-PL-01501	5	Location Identification Connection Part Numbers
	FSG-PL-01502	5	Location Identification Connection Part Numbers
Circuit Breaker (15 A)	FSG-PL-01507	1	Location Identification Connection Part Numbers
Circuit Breaker (30 A)	FSG-PL-01507	1	Location Identification Connection Part Numbers
Discharge (1 thru 12) (Akron Brass Swing-Out™	FSG-PL-01508	1	Part Numbers
valve)	FSG-PL-01506	1 and 2	Location Identification Connection
	FSG-PL-01504	1	Connection
Ship Loose Valves ONLY (Location)	FSG-PL-01501	1	Location (General)
	FSG-PL-01502	1	Location (General)



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item	Plate/Drawing	Sheet	Content
Dual Action Air Cylinder	FSG-PL-01501	4	Location
(Part of SAM Drain Manifold Assembly)	FSG-PL-01502	4	Location
	538-00100-000	1	Location Connection
	538-00097-00X	2	Part Numbers
Dual Action Air Cylinder	FSG-PL-01501	5	Location
(Part of SAM Priming Feature Block Assembly)	FSG-PL-01502	5	Location
	538-00099-000	1 and 2	Location Connection
	538-00097-00X	1	Part Numbers
Flowmeter (Discharge 1 thru 12)	FSG-PL-01506	1 and 2	Identification Connection Part Numbers
Ground Loop Isolator	FSG-PL-01503	17	Connector Part Numbers
	FSG-PL-01505	1	Connection Part Numbers
ITL-40 (For Water)	FSG-PL-01501	2	Location
	FSG-PL-01502	2	Location
	FSG-PL-01505	1	Identification Connection Part Numbers
Level Sensor (Gearbox)	FSG-PL-01501	1	Location (General)
		4	Identification Connection Part Numbers
	FSG-PL-01502	1	Location(General)
		4	Identification Connection Part Numbers
LH MIV 2.0	FSG-PL-01501	1	Location (General)
		6	Identification Connection
	FSG-PL-01503	16	Deutsch Part Nos.
	FSG-PL-01502	1	Location(General)
		6	Identification Connection
	FSG-PL-01491	2 thru 5	Part Numbers
		2	Repair Kits
MIV Control Module	FSG-PL-01491	4	Location
		2	Part Numbers
	610-00050	1	Connector P/N Info



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item	Plate/Drawing	Sheet	Content
MIV-A Control Module	FSG-PL-01501	1	Location (General)
		3	Identification Connection Part Numbers
	FSG-PL-01502	1	Location (General)
		3	Identification Connection Part Numbers
	FSG-PL-01503	6	Connector Part Numbers
	FSG-PL-01504	1	Identification Connection
Matrix Governor Module	FSG-PL-01501	1	Location (General)
		3	Identification Connection Part Numbers
	FSG-PL-01502	1	Location (General)
		3	Identification Connection Part Numbers
	FSG-PL-01503	4	Connector Part Numbers
	FSG-PL-01504	1	Identification Connection
Power Breaker Box	FSG-PL-01501	1	Location (General)
		3	Location Identification
	FSG-PL-01502	1	Location (General)
		3	Location Identification
	FSG-PL-01507	1	Identification Connection Part Numbers
Pressure Sensor (Discharge 1 thru 12) (Pump Panel Master Pressure Sensors; use the same part.)	FSG-PL-01506 (Transducer, 300 PSI)	1 and 2	Location Identification Connection Part Numbers
Pressure Transducer (ITL-40)	118253	4	Part Numbers
(Water Tank, Foam Tank A, or Foam Tank B)	(Operation Manual)	18	Location Identification Part Numbers
		19 and 21	Connection



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item	Plate/Drawing	Sheet	Content
Pressure Transducer (Priming/Air Bleed	FSG-PL-01501	1	Location (General)
AKA Water Column Sensor)		4	Location Identification Connection
	FSG-PL-01502	1	Location (General)
		4	Location Identification Connection
	538-00100-000	1	Location Identification Connection Part Numbers
RH Bottom MIV 2.0	FSG-PL-01501	1	Location (General)
		7	Identification Connection
	FSG-PL-01503	16	Deutsch Part Nos.
	FSG-PL-01502	1	Location(General)
		7	Identification Connection
	FSG-PL-01491	2 thru 5	Part Numbers
		2	Repair Kits
RH MIV 2.0	FSG-PL-01501	1	Location (General)
		6	Identification Connection
	FSG-PL-01503	16	Deutsch Part Nos.
	FSG-PL-01502	1	Location(General)
		6	Identification Connection
	FSG-PL-01491	2 thru 5	Part Numbers
		2	Repair Kits
SAM Control Center	FSG-PL-01501	2	Location (General)
	FSG-PL-01502	2	Location (General)
	FSG-PL-01503	2 and 17	Connector Part Numbers
	FSG-PL-01504	1	Identification Connection
	FSG-PL-01505	1	Connection Part Numbers



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item	Plate/Drawing	Sheet	Content
SAM Pump Controller	FSG-PL-01501	2	Location (General)
	FSG-PL-01502	2	Location (General)
	FSG-PL-01503	2 and 17	Connector Part Numbers
	FSG-PL-01504	1	Identification Connection
	FSG-PL-01505	1	Connection Part Numbers
Sensor Module	FSG-PL-01501	1	Location (General)
		3	Location Identification Connection Part Numbers
	FSG-PL-01502	1	Location(General)
		3	Location Identification Connection Part Numbers
	FSG-PL-01503	5	Connector Part Numbers
	FSG-PL-01504	1	Identification Connection
Solenoid (All)	FSG-PL-01501	1	Location (General)
	FSG-PL-01502	1	Location(General)
(Air Bleed)	FSG-PL-01501	6 and 7	Location Identification Connection Part Numbers
	FSG-PL-01502	6 and 7	Location Identification Connection Part Numbers
	FSG-PL-01503	15	Connector Part Numbers
(Auxiliary Pump Cooling)	FSG-PL-01501	8	Location Identification Connection Part Numbers
	FSG-PL-01502	8	Location Identification Connection Part Numbers
	FSG-PL-01503	15	Connector Part Numbers



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item		Plate/Drawing	Sheet	Content
Solenoid - CONTINUED	(Quick Prime)	FSG-PL-01501	5	Location Identification Connection Part Numbers
		FSG-PL-01502	5	Location Identification Connection Part Numbers
		FSG-PL-01503	15	Connector Part Numbers
Tank Fill (Akron Brass Swing-Out™ va	lve)	FSG-PL-01501	1	Location (General)
			8	Location Identification Connection
		FSG-PL-01502	1	Location(General)
			8	Location Identification Connection
		FSG-PL-01503	7	Connector Part Numbers
		FSG-PL-01506	4	Part Numbers
		FSG-PL-01508	1	Part Numbers
Tank-To-Pump (Akron Brass Swing-Ou	t™ valve)	FSG-PL-01501	1	Location (General)
			5	Location Identification Connection
		FSG-PL-01502	1	Location(General)
			5	Location Identification Connection
		FSG-PL-01503	7	Connector Part Numbers
		FSG-PL-01506	4	Part Numbers
		FSG-PL-01508	1	Part Numbers
Temperature Sensor	(Gearbox)	FSG-PL-01501	1	Location (General)
			4	Location Identification Connection Part Numbers
		FSG-PL-01502	1	Location(General)
			4	Location Identification Connection Part Numbers
		FSG-PL-01503	15	Connector Part Numbers



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item		Plate/Drawing	Sheet	Content
Temperature Sensor	(Pump Body)	FSG-PL-01501	1	Location (General)
			3	Location Identification Connection Part Numbers
		FSG-PL-01502	1	Location(General)
			3	Location Identification Connection Part Numbers
		FSG-PL-01503	15	Connector Part Numbers
T-Port MIV 2.0		FSG-PL-01501	1	Location (General)
			5	Identification Connection
		FSG-PL-01503	16	Deutsch Part Nos.
		FSG-PL-01502	1	Location(General)
			5	Identification Connection
		FSG-PL-01491	2 thru 5	Part Numbers
			2	Repair Kits
Twister		FSG-PL-01501	2	Location (General)
		FSG-PL-01502	2	Location(General)
		FSG-PL-01503	3	Connector Part Numbers
		FSG-PL-01504	1	Connection
		FSG-PL-01505	1	Connection Part Numbers
Water Detector	(AII)	FSG-PL-01501	1	Location (General)
		FSG-PL-01502	1	Location(General)
	(Autolube)	FSG-PL-01501	3	Location Identification Connection Part Numbers
		FSG-PL-01502	3	Location Identification Connection Part Numbers
		FSG-PL-01503	16	Connector Part Numbers



Table 1. Component To Drawing Cross-Reference - CONTINUED

Component/Item		Plate/Drawing	Sheet	Content
Water Detector – CONTINUED (C	Gearbox)	FSG-PL-01501	3	Location Identification Connection Part Numbers
		FSG-PL-01502	з	Location Identification Connection Part Numbers
		FSG-PL-01503	16	Connector Part Numbers
	(Primer)	FSG-PL-01501	3	Location Identification Connection Part Numbers
		FSG-PL-01502	3	Location Identification Connection Part Numbers
		FSG-PL-01503	16	Connector Part Numbers
OPTIONAL Component/Item		Plate/Drawing	Sheet	Content
Auxiliary Intake (Pony) (Akron Brass Swing-Out™ valve)	(AII)	FSG-PL-01504	1	Connection
(Multiple sizes available for each position.)	(LF) (LR) (RF) (RR)	FSG-PL-01508	1	Part Numbers
Auxiliary SAM Control Center (1 and/or 2)		FSG-PL-01501	2	Location (General)
		FSG-PL-01502	2	Location(General)
		FSG-PL-01503	2 and 17	Connector Part Numbers
		FSG-PL-01504	1	Connection
		FSG-PL-01505	1	Connection Part Numbers
DC-DC Converter (12 V-24 V)		FSG-PL-01503	10	Connector Part Numbers
		FSG-PL-01505	4	Connection Part Numbers
Docking Station (Tablet Mounting) (Location selected by OEM/End User)		FSG-PL-01505	4	Identification Connection Part Numbers

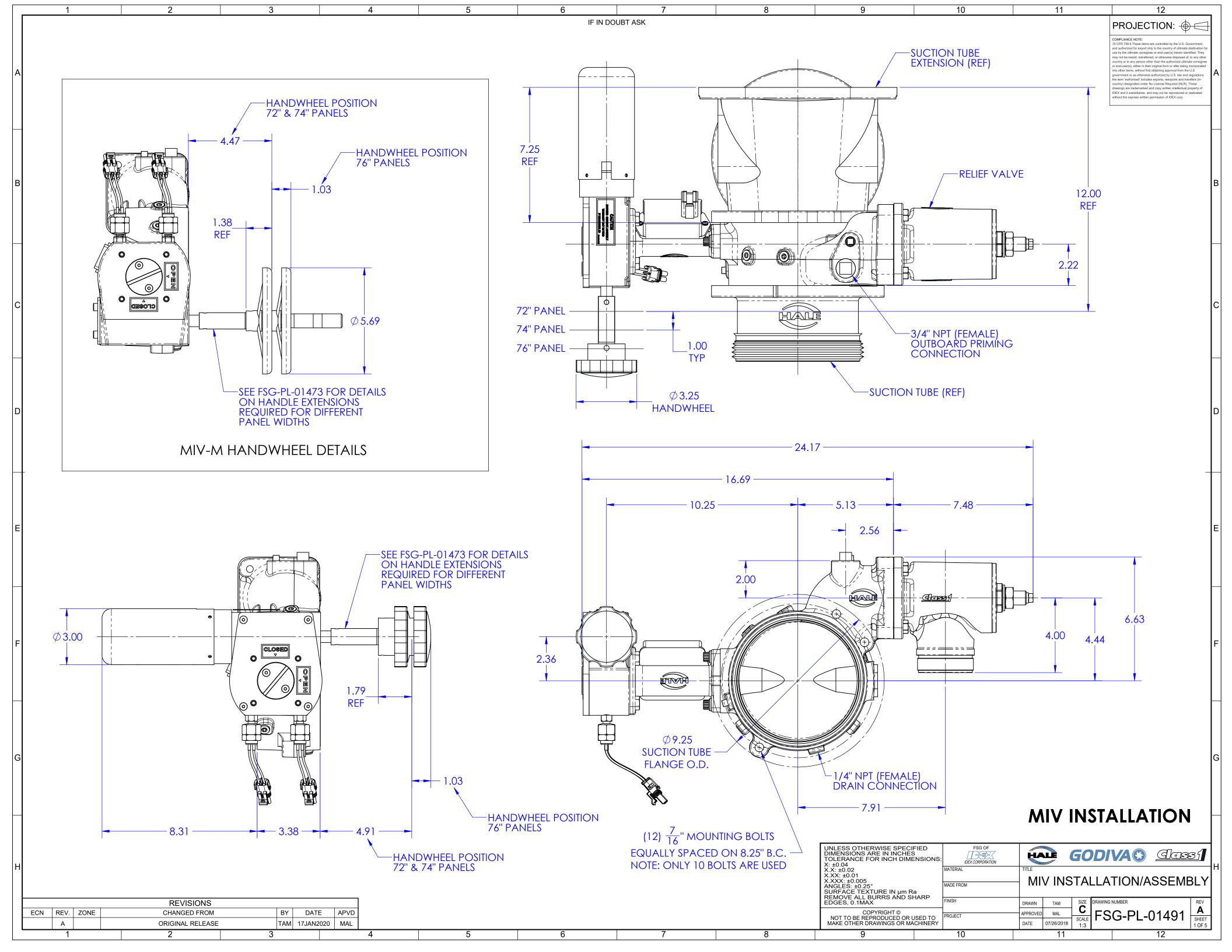


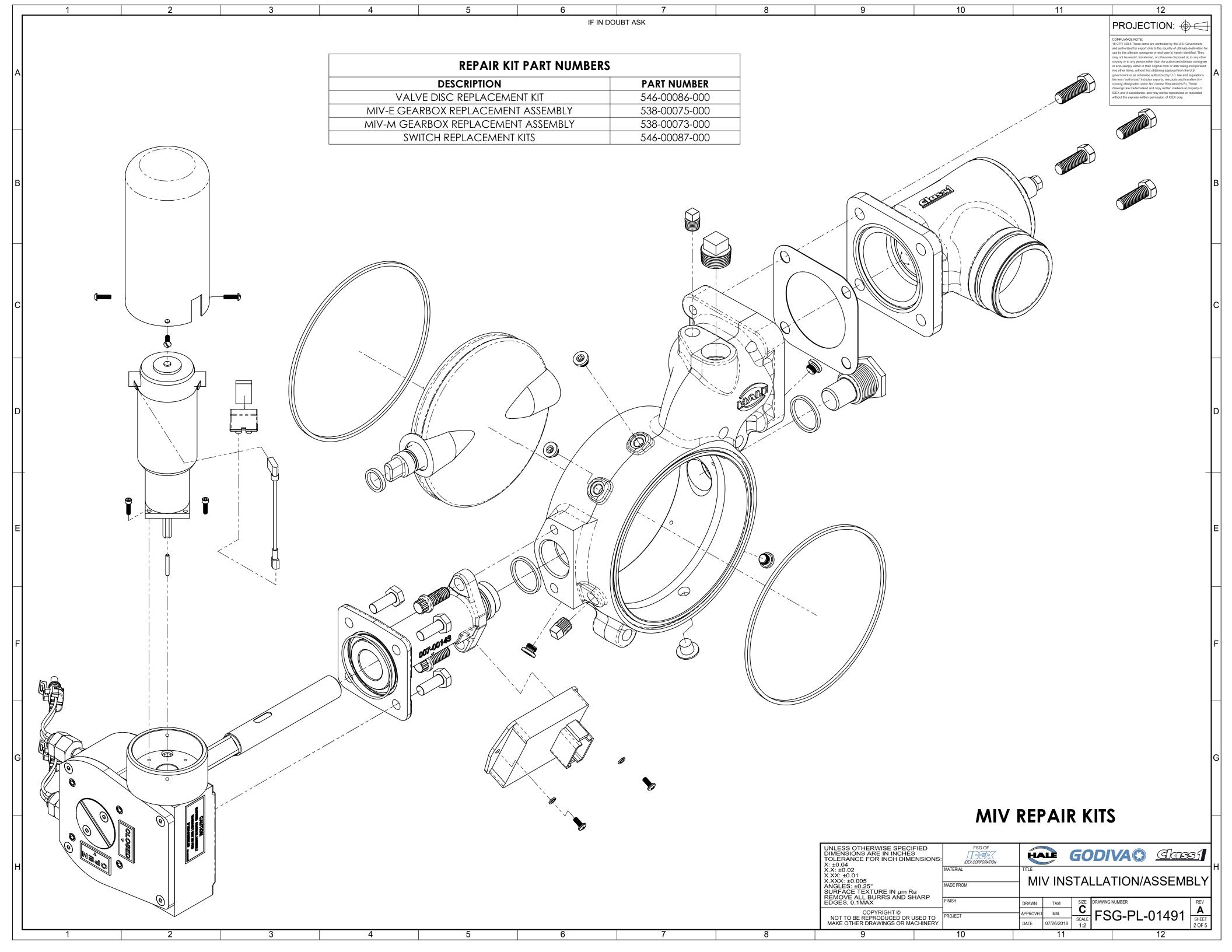
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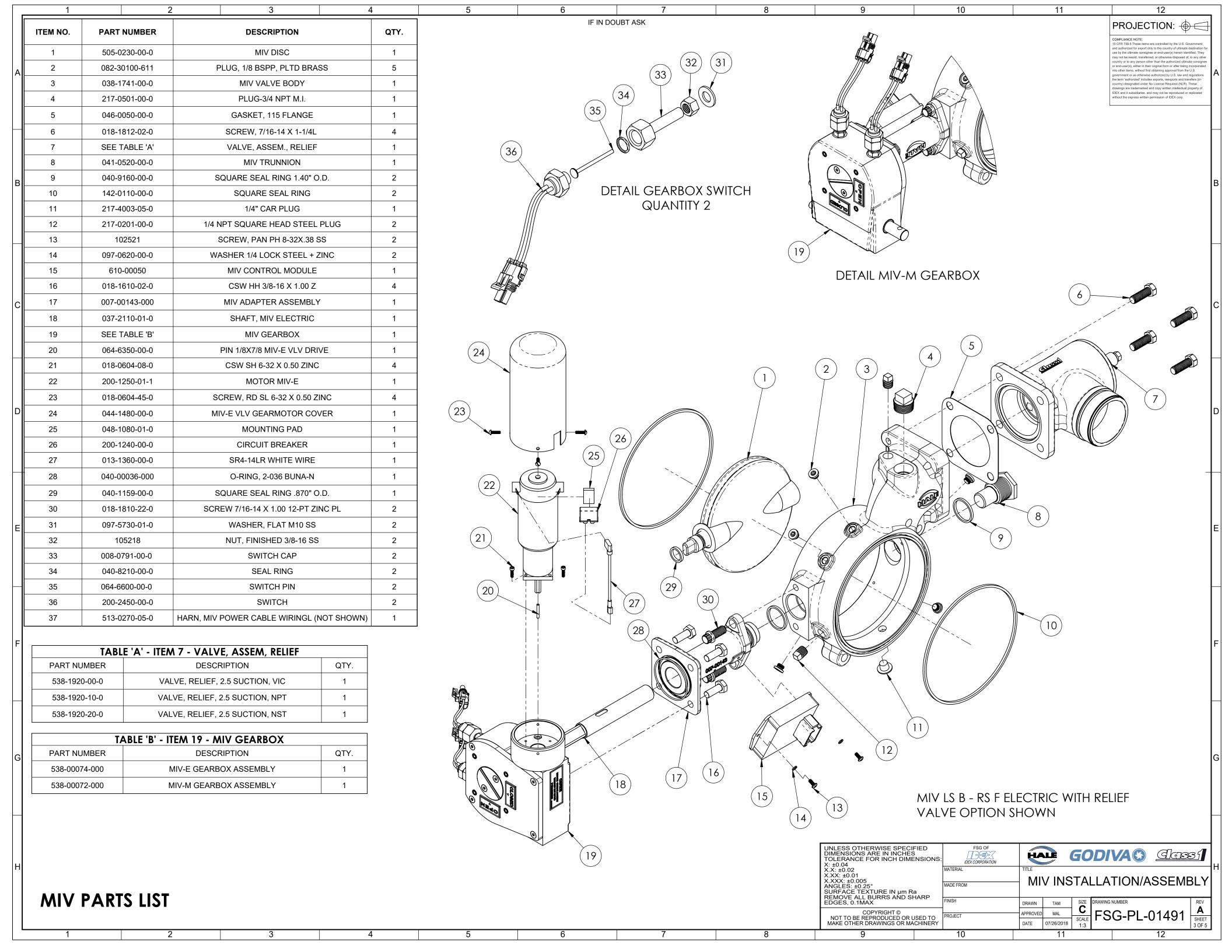
Component/Item	Plate/Drawing	Sheet	Content
OPTIONAL Component/Item - CONTINUED			
ITL-40 (Foam Tank A or Foam Tank B	FSG-PL-01501	2	Location
	FSG-PL-01502	2	Location
	FSG-PL-01505	1	Identification Connection Part Numbers
Navigator (9323)	FSG-PL-01503	7 and 8	Connector Part Numbers
	FSG-PL-01504	1	Connection
	FSG-PL-01505	5	Connection Part Numbers
Navigator (9335)	FSG-PL-01503	7 and 8	Connector Part Numbers
	FSG-PL-01504	1	Connection
	FSG-PL-01505	5	Connection Part Numbers
Pressure Transducer (ITL-40) (Foam Tank A)	118253 (Operation Manual)	4	Part Numbers
		18	Location Identification Part Numbers
		19 and 21	Connection
Pressure Transducer (ITL-40) (Foam Tank B)	118253	4	Part Numbers
	(Operation Manual)	18	Location Identification Part Numbers
		19 and 21	Connection
Tablet (Ruggedized)	FSG-PL-01504	1	Location Identification Connection Part Numbers
Wi-Fi Router	FSG-PL-01503	10	Connector Part Numbers
	FSG-PL-01505	4	Connection Part Numbers

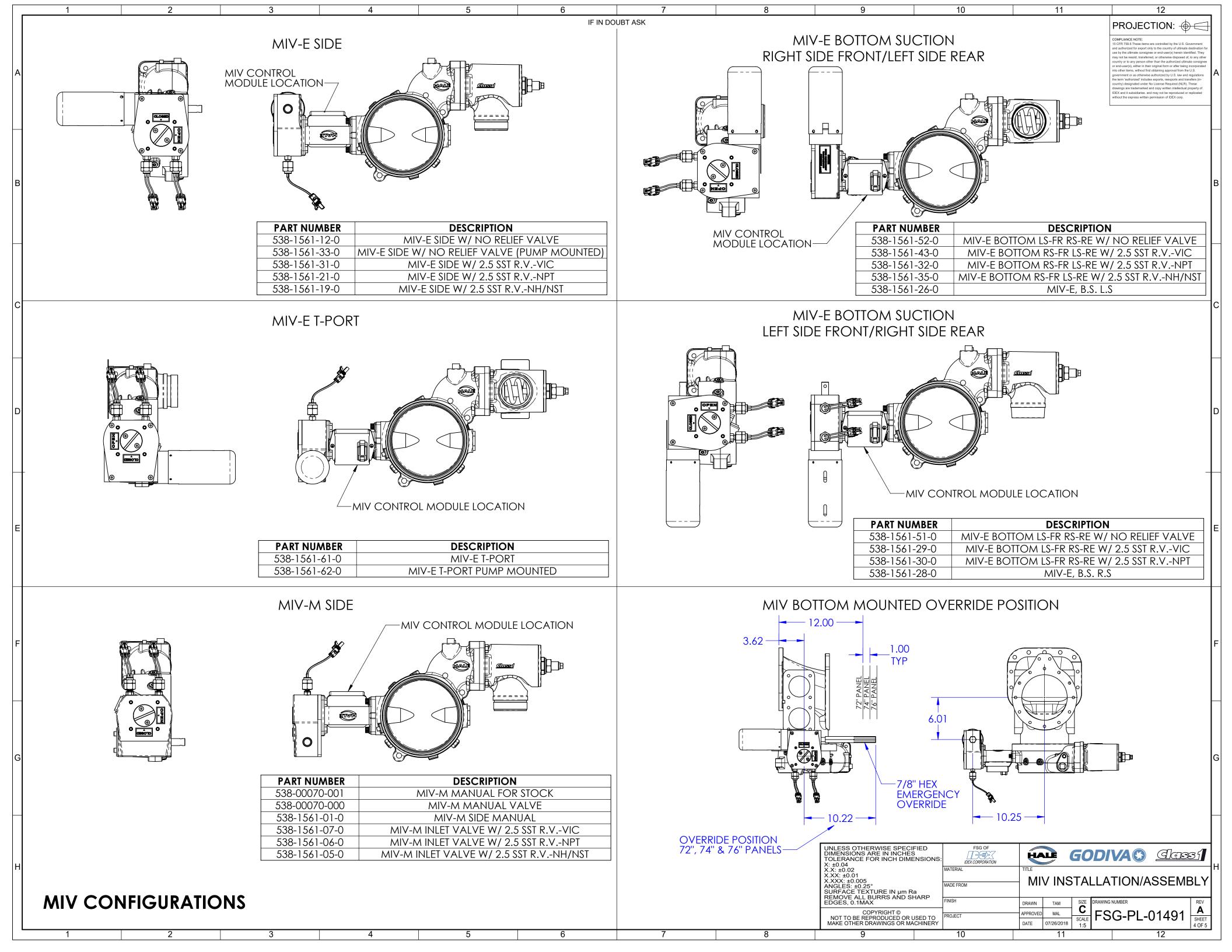


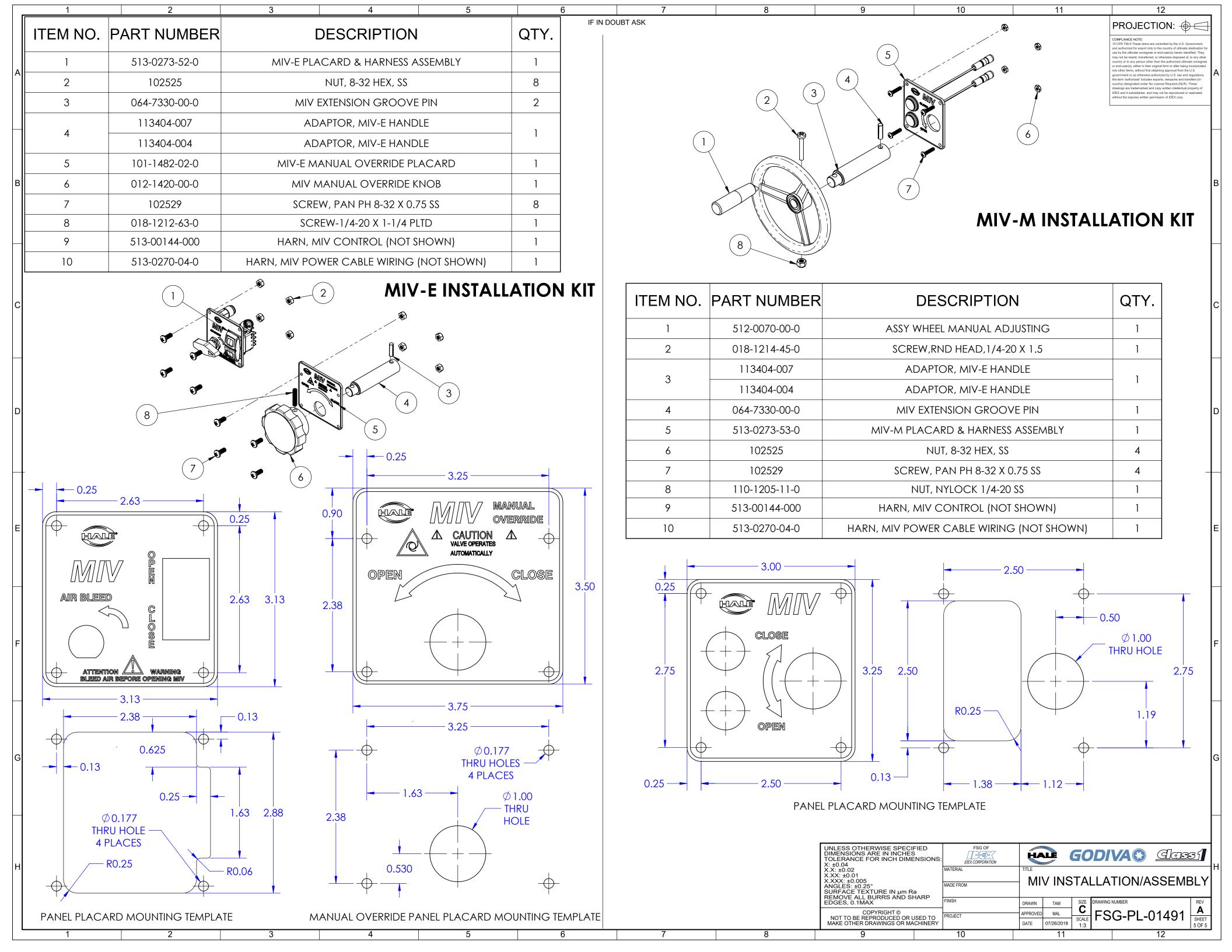
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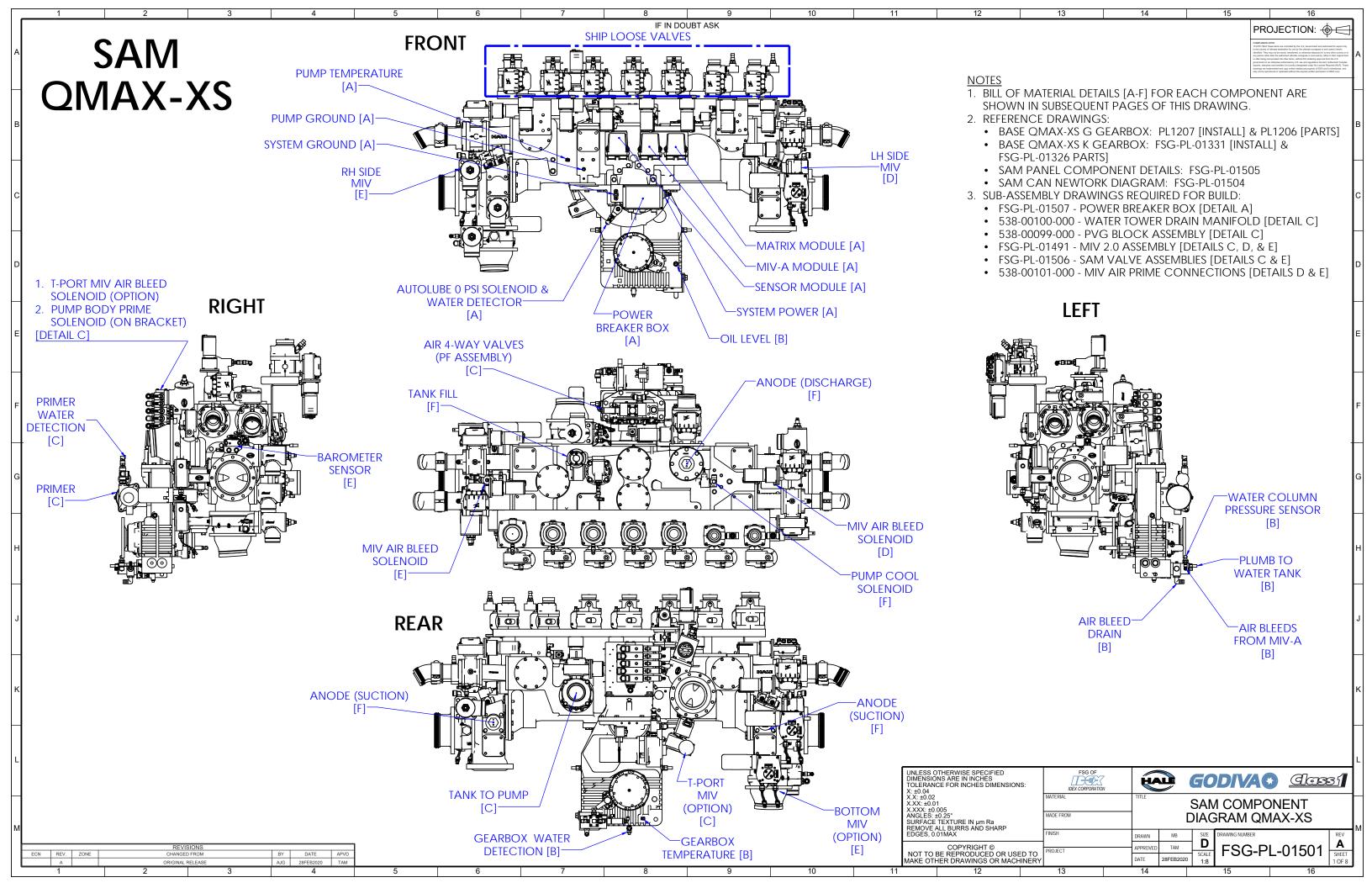


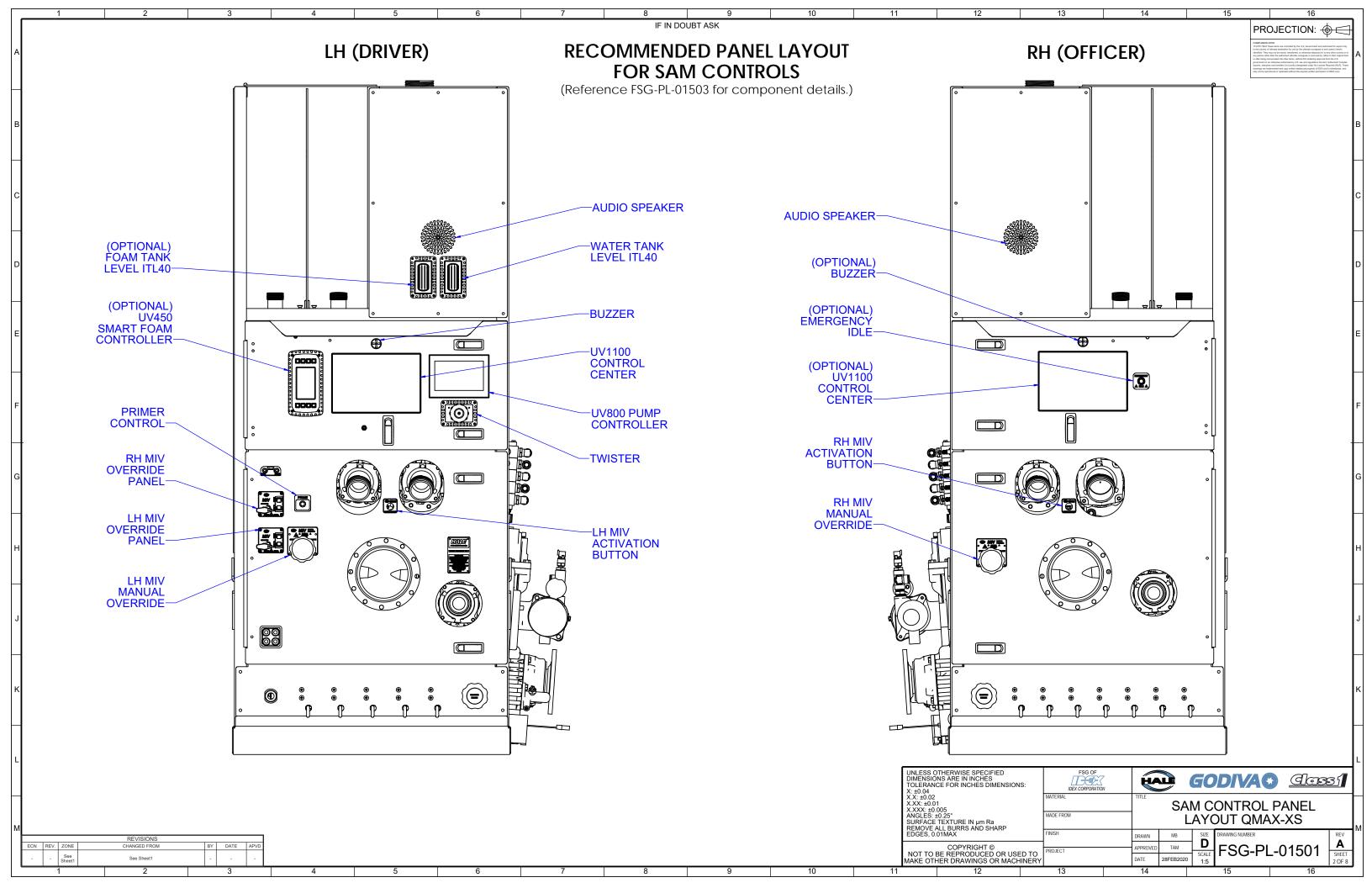


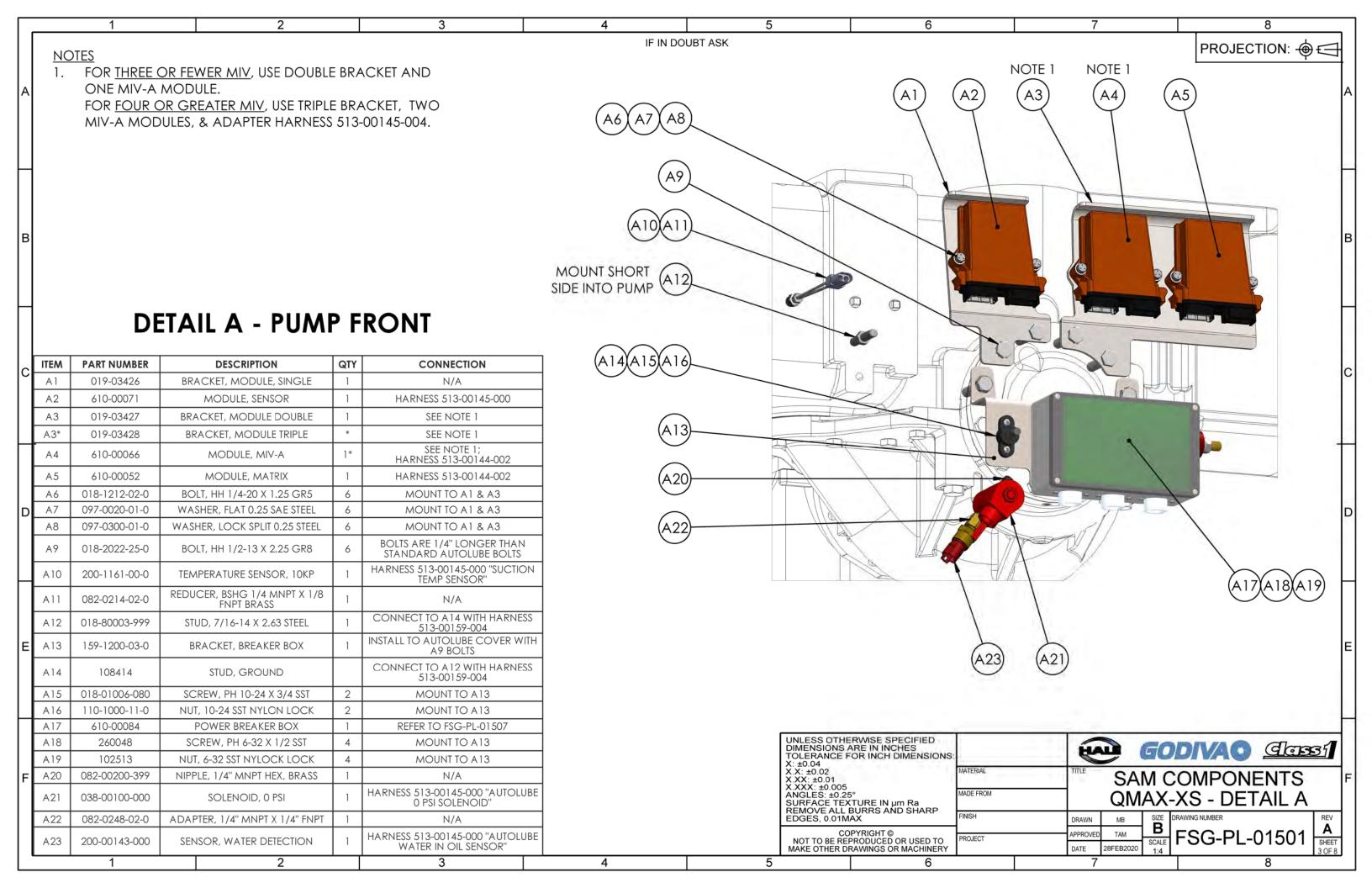


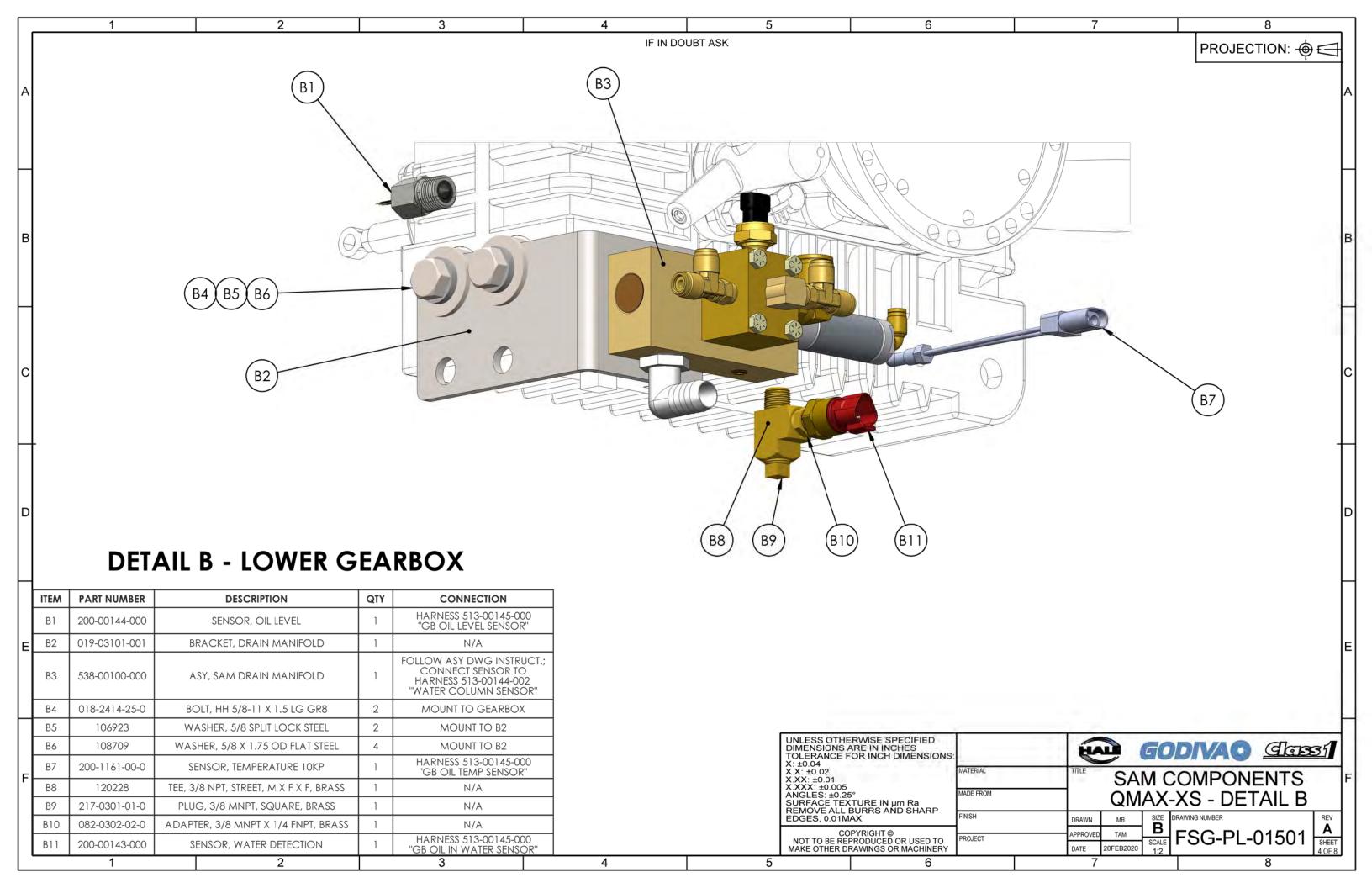


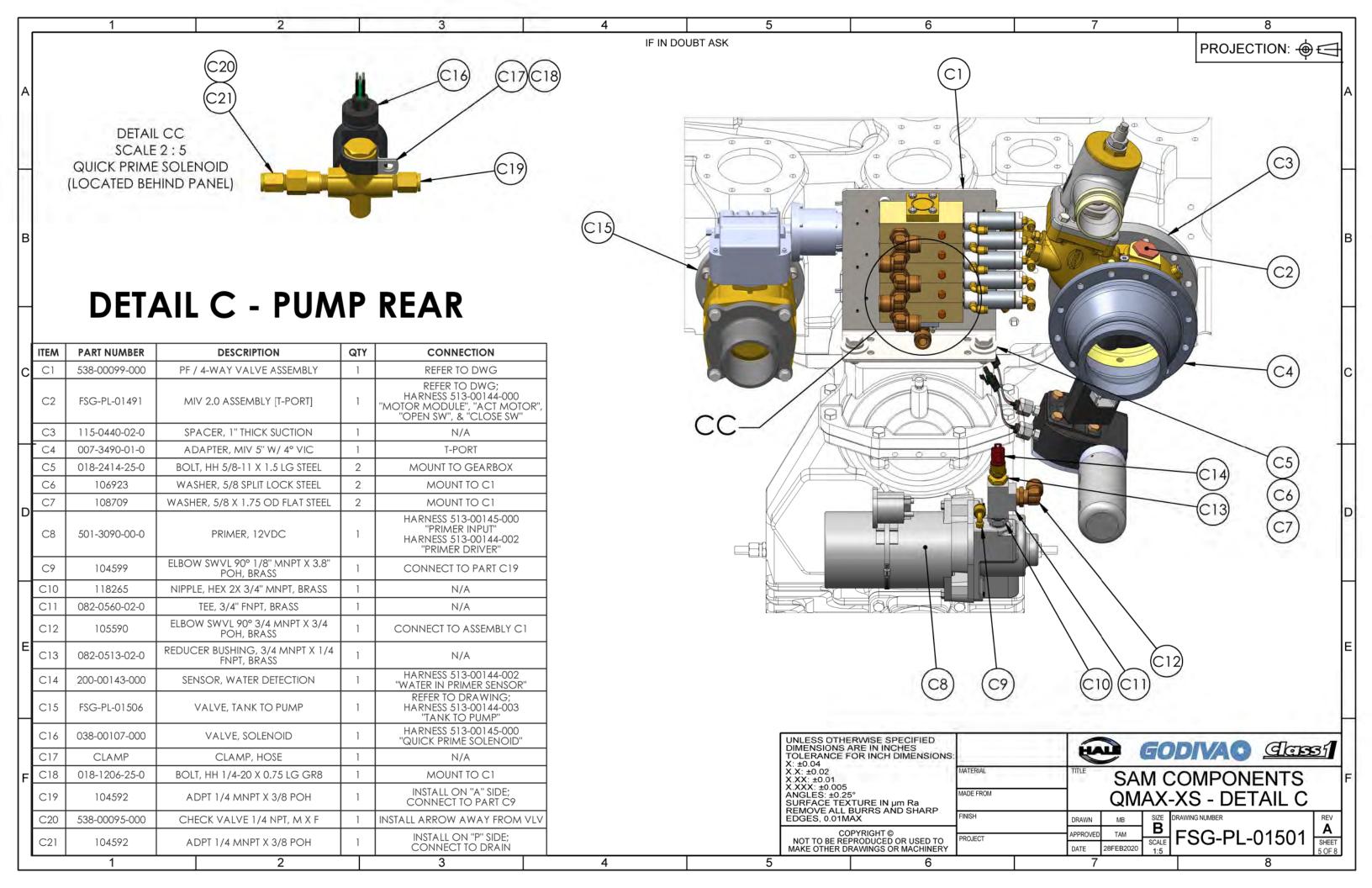
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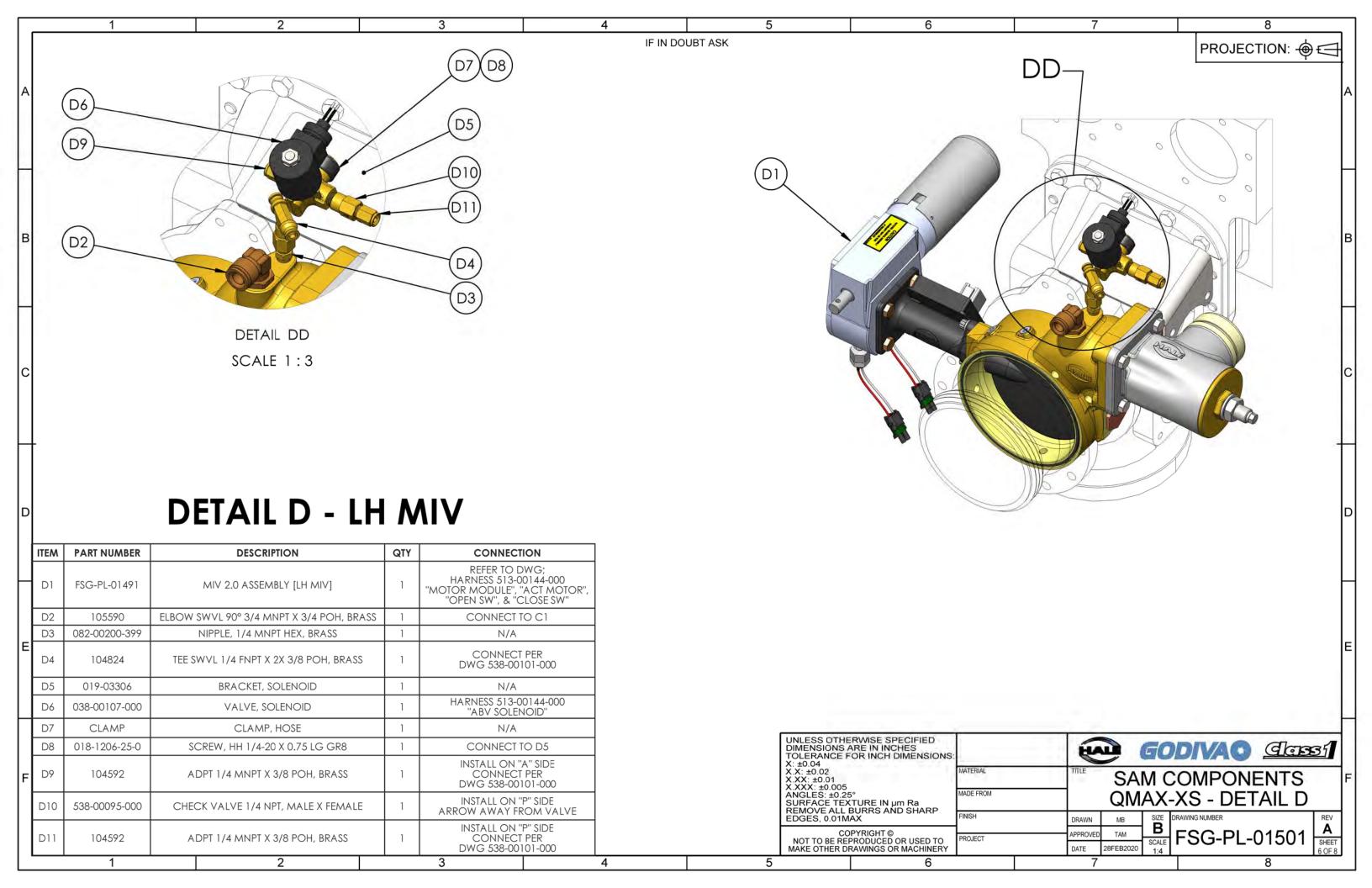


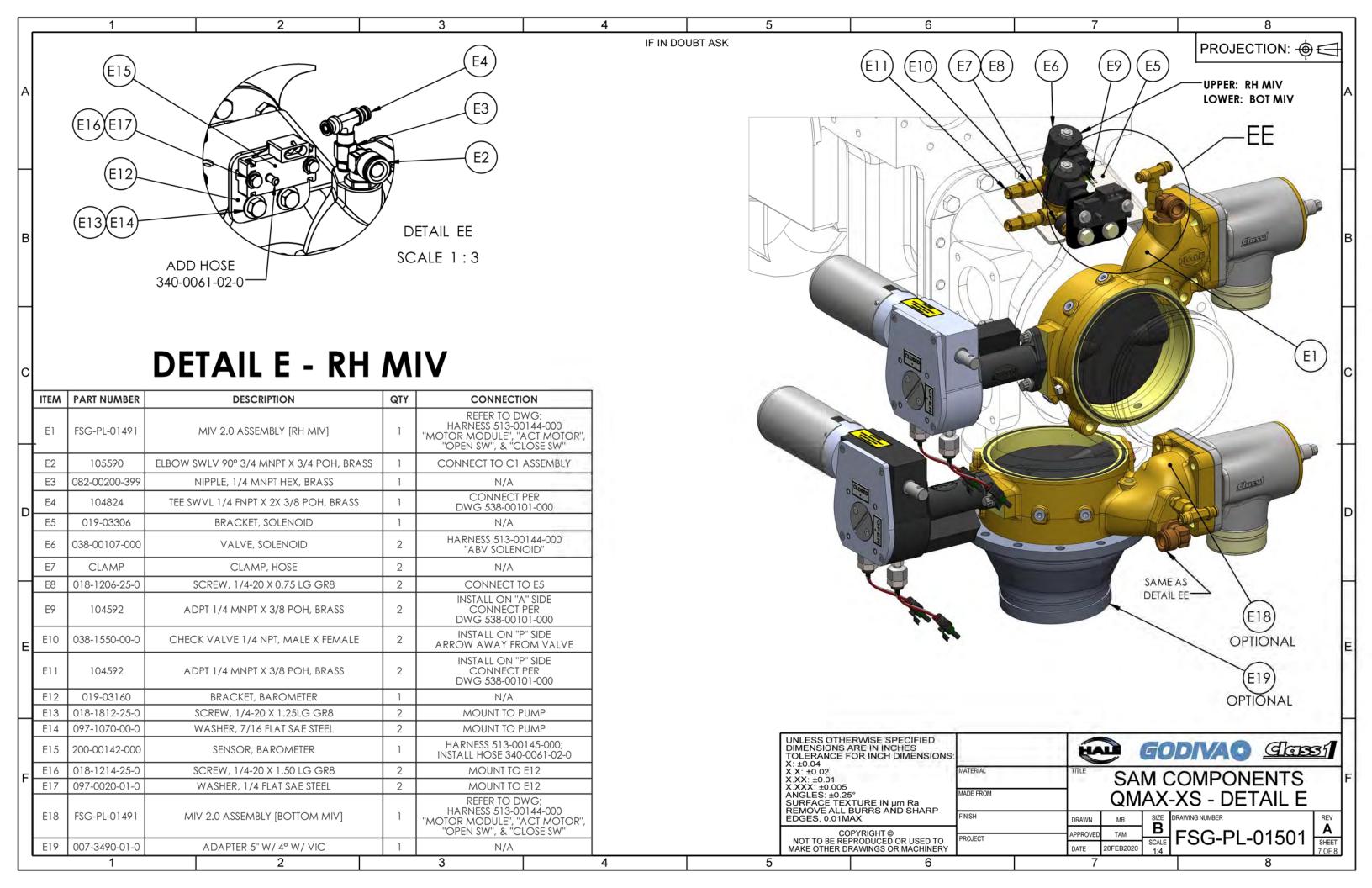


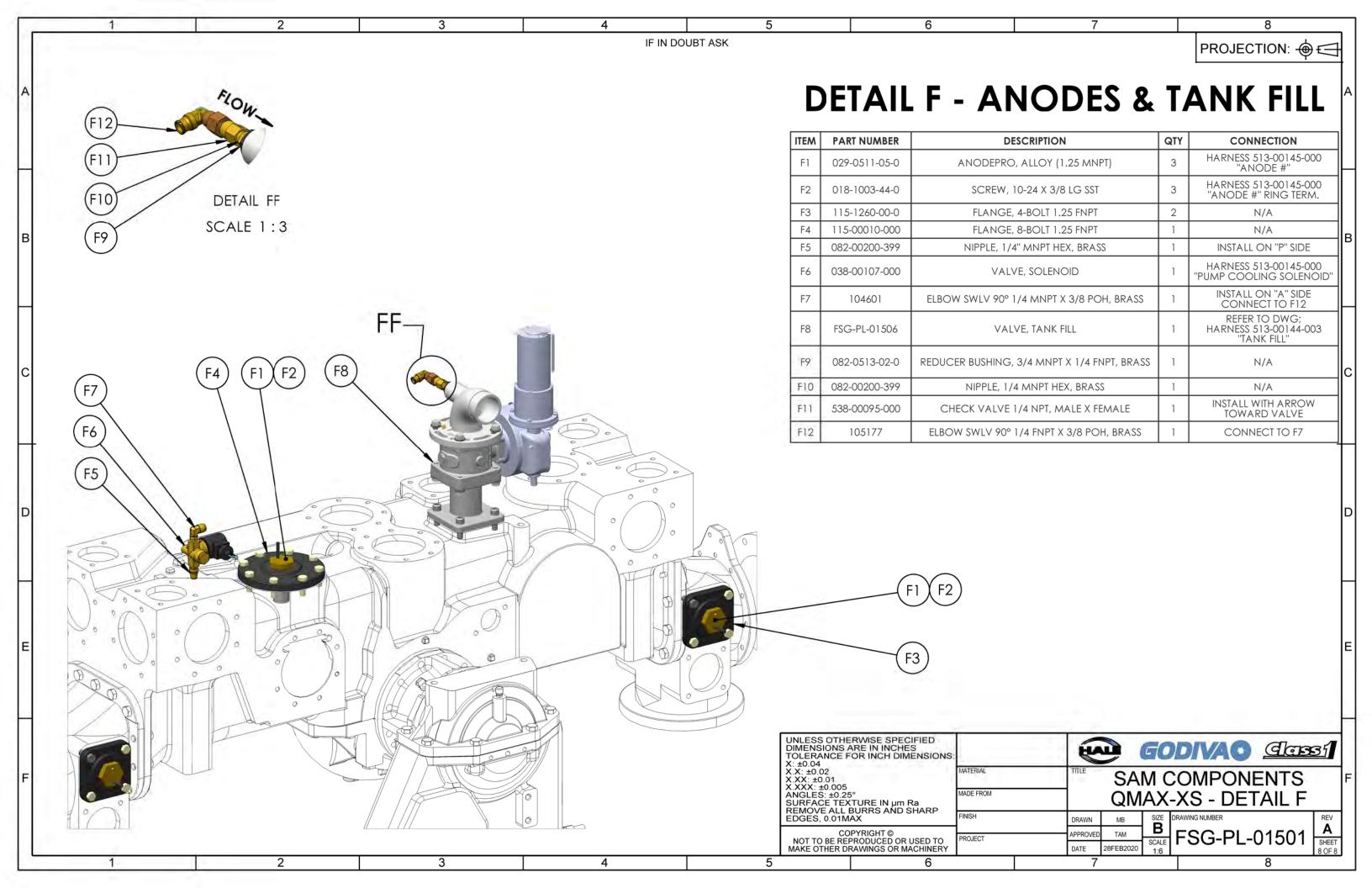


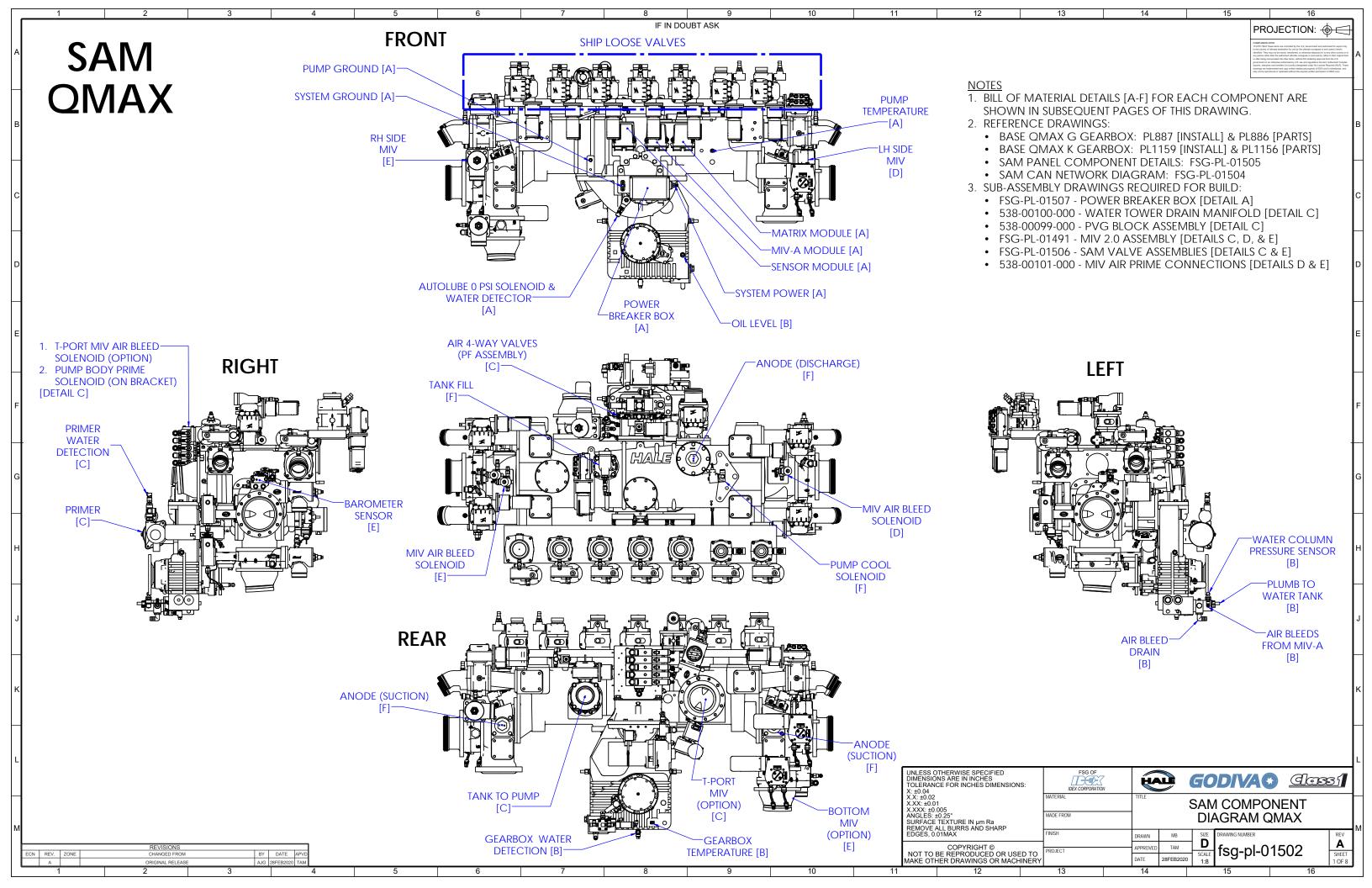


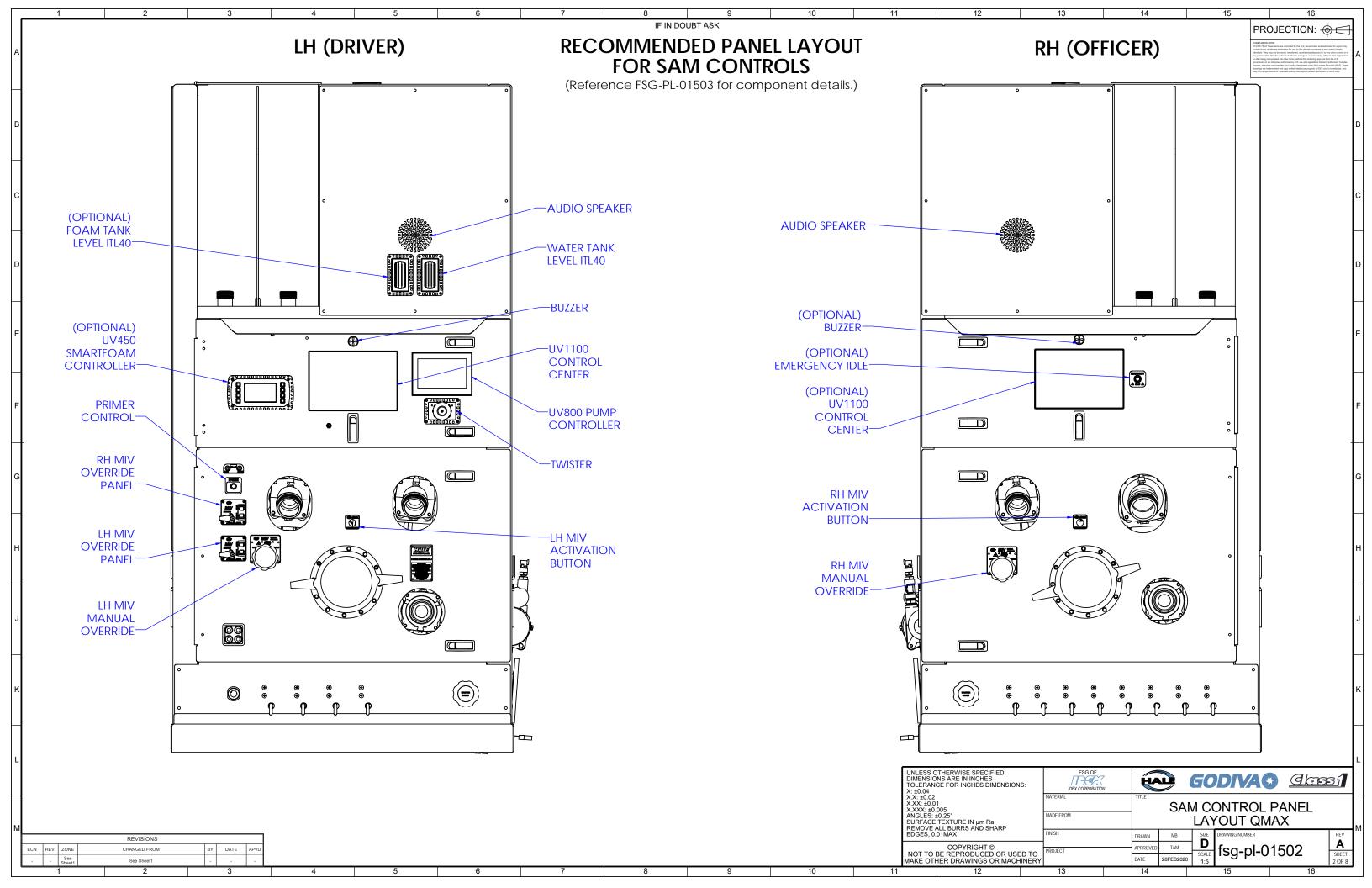


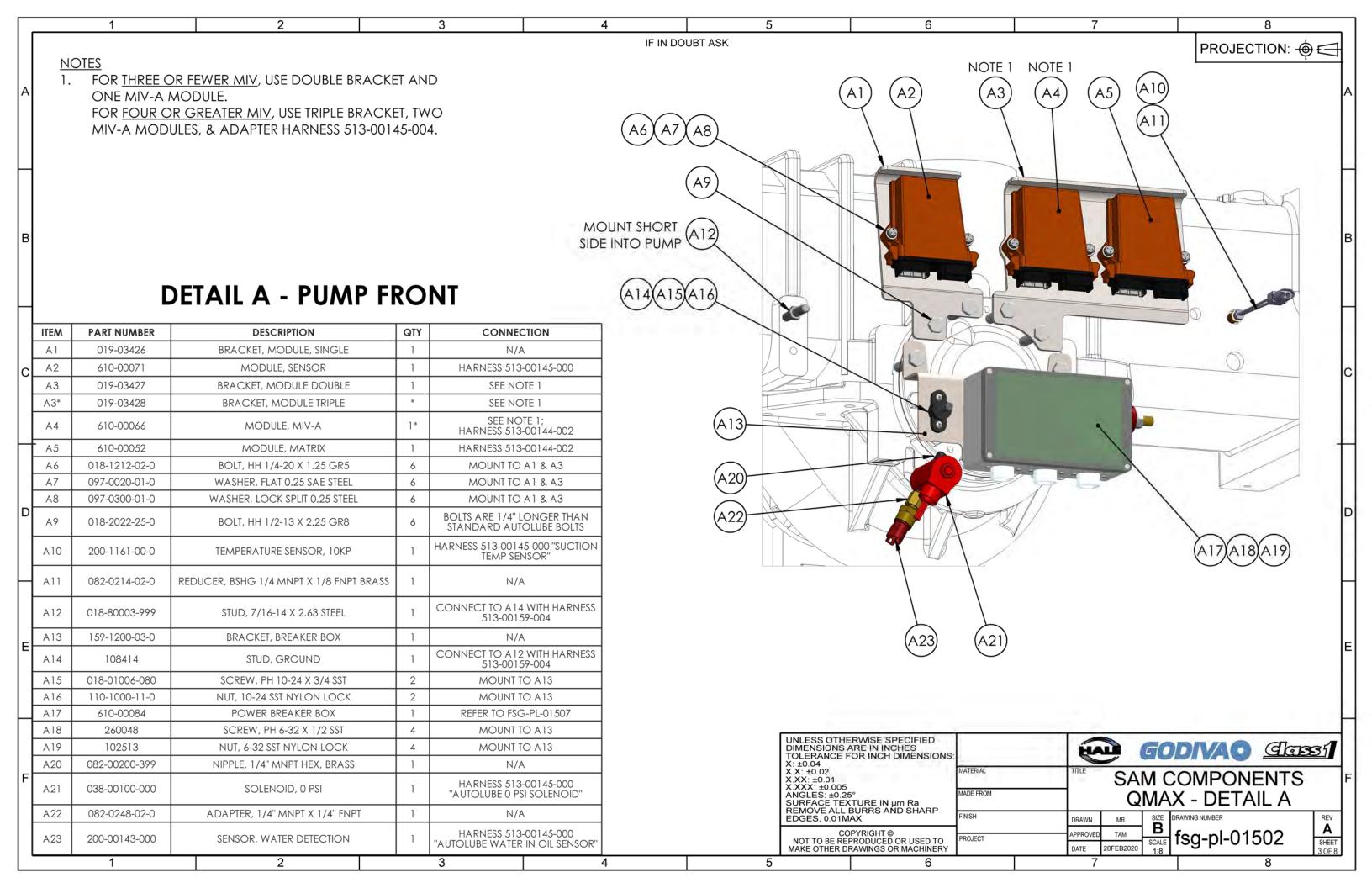


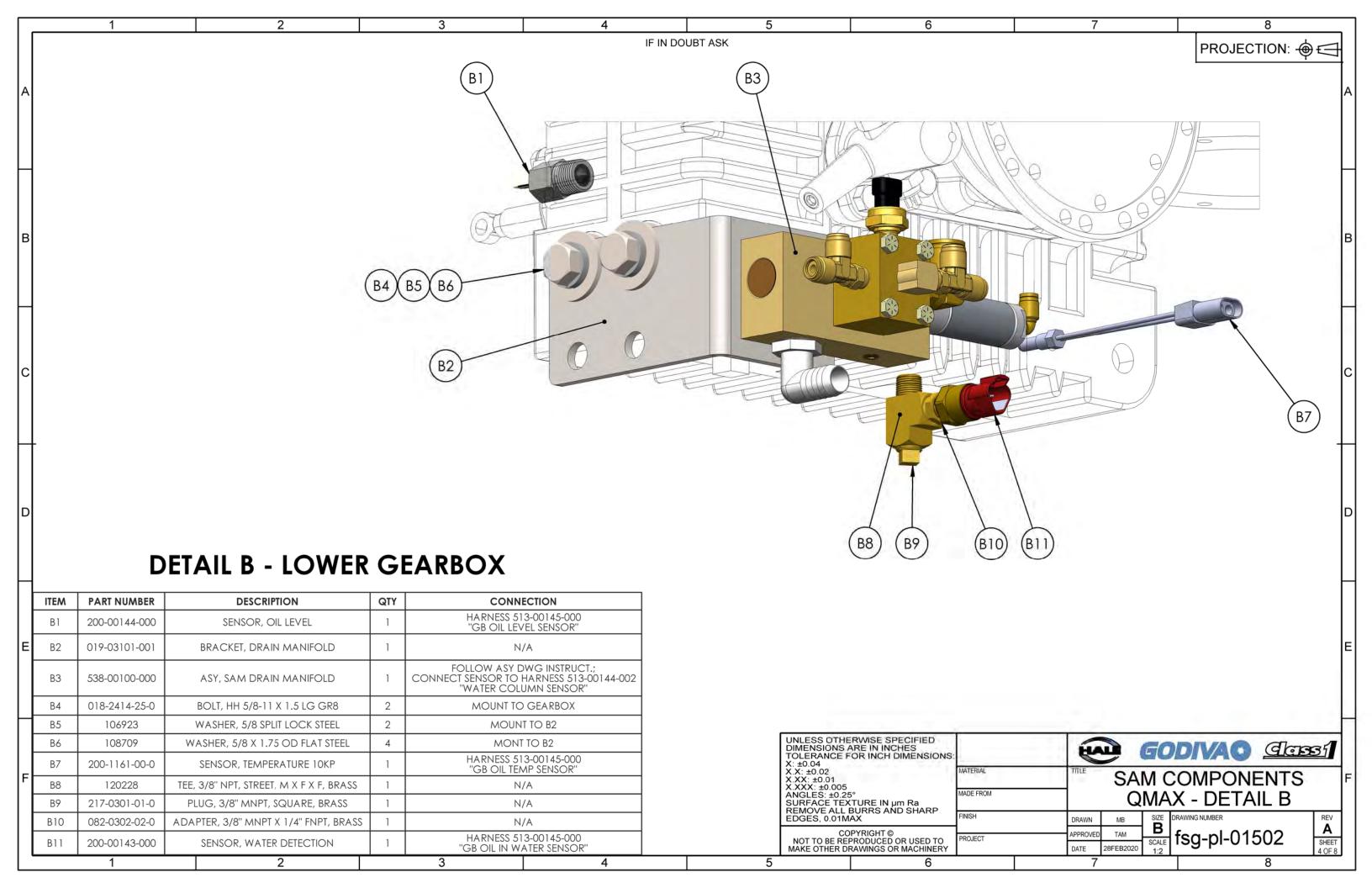


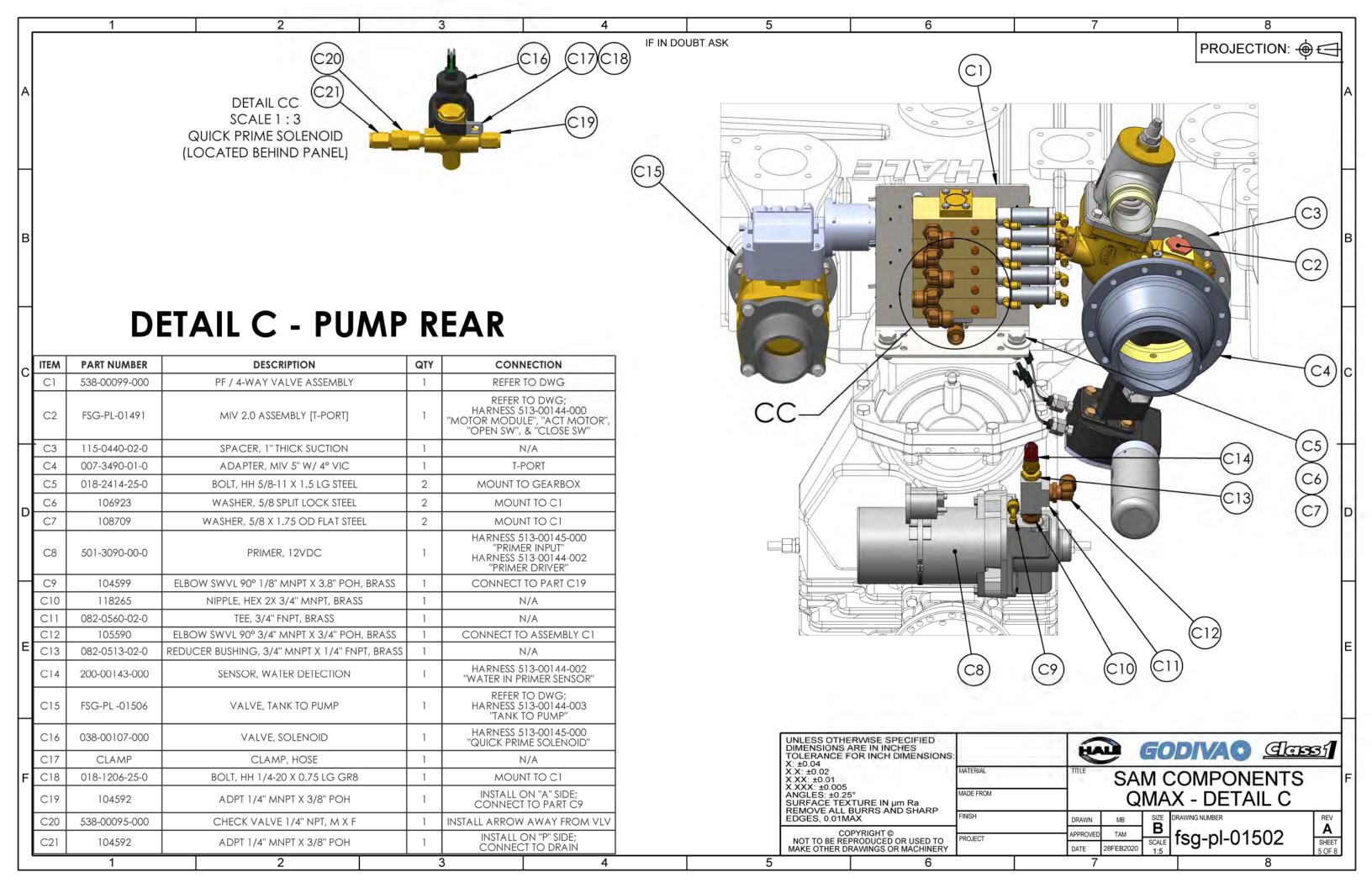


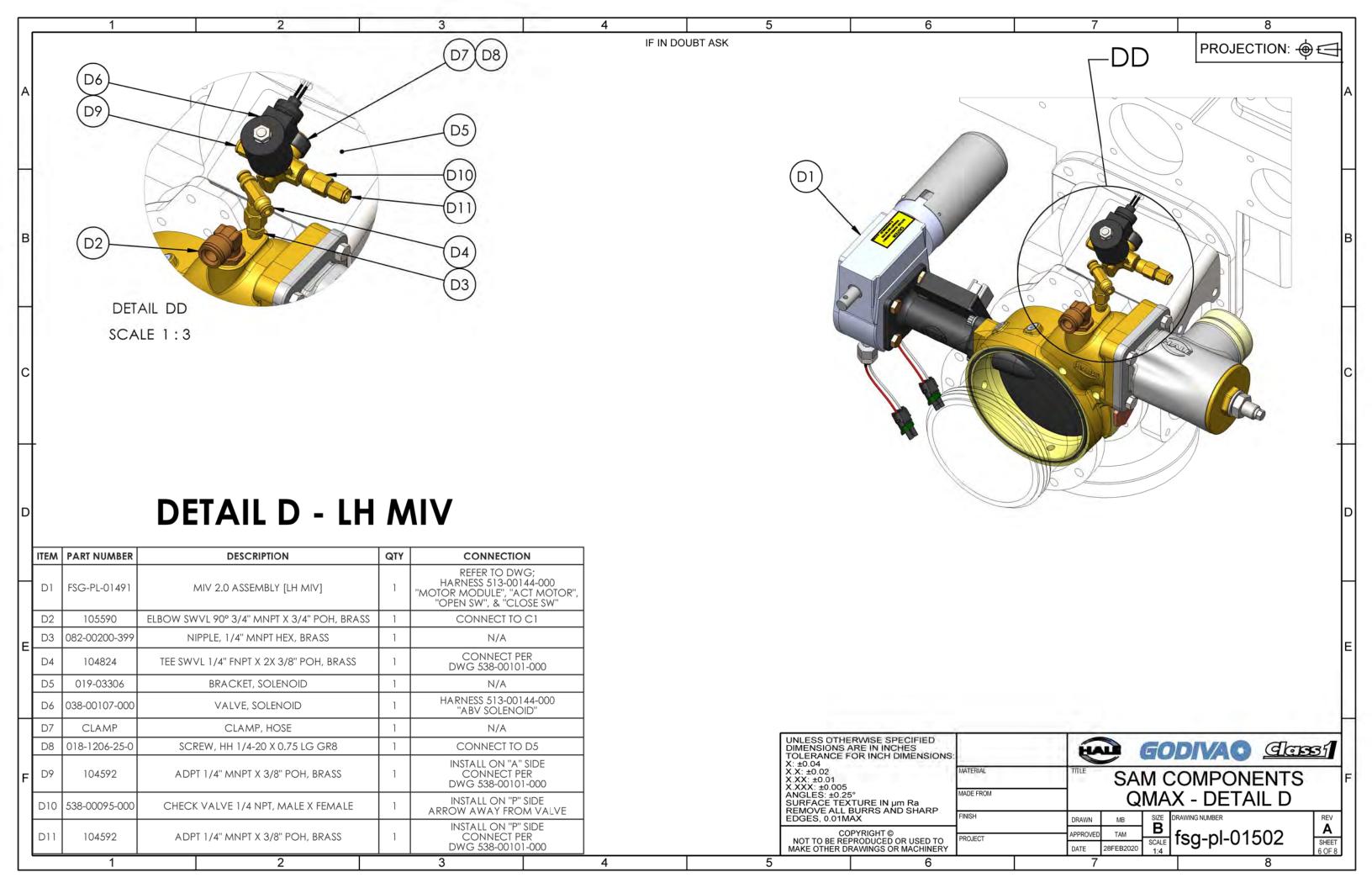


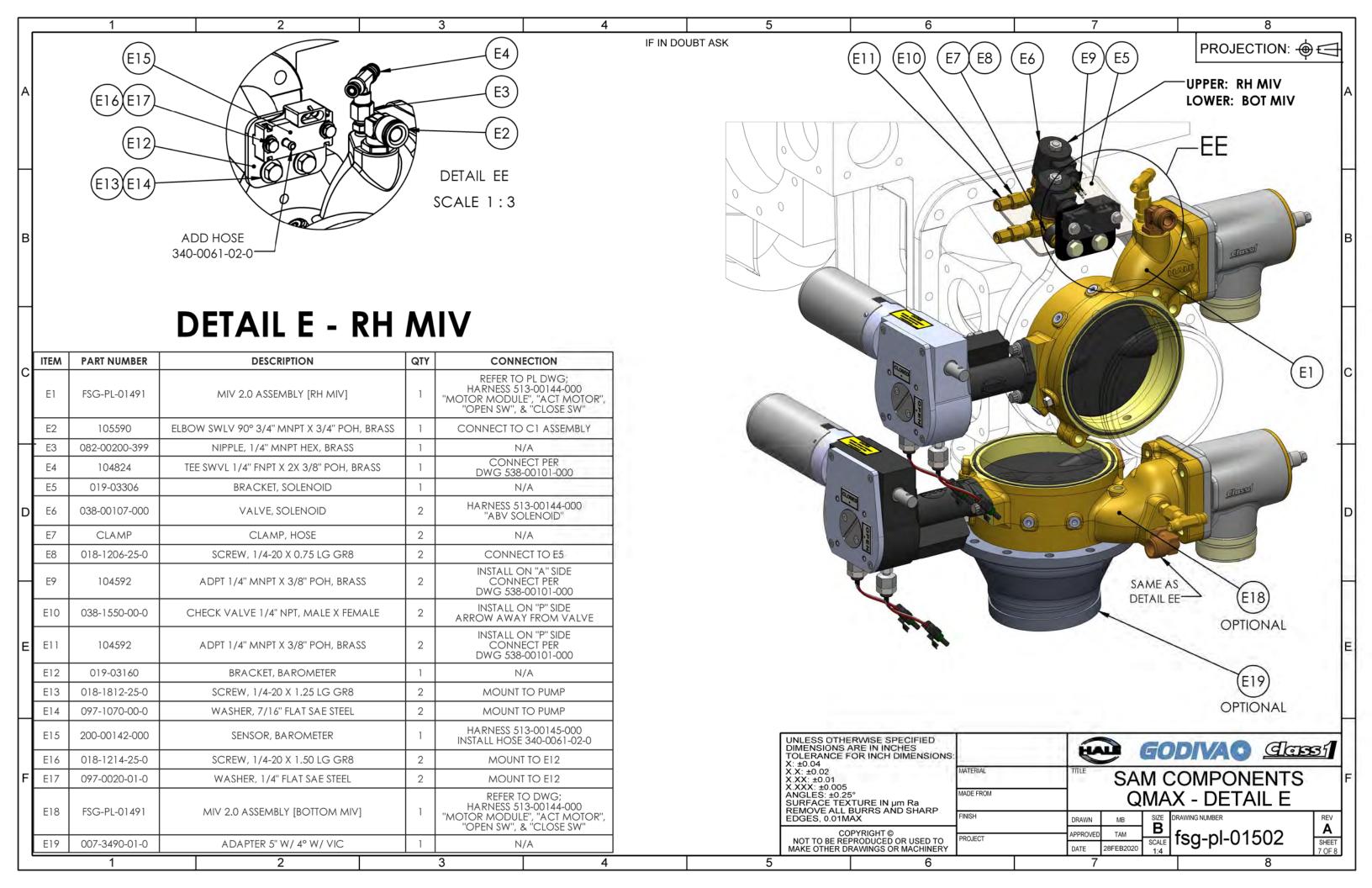


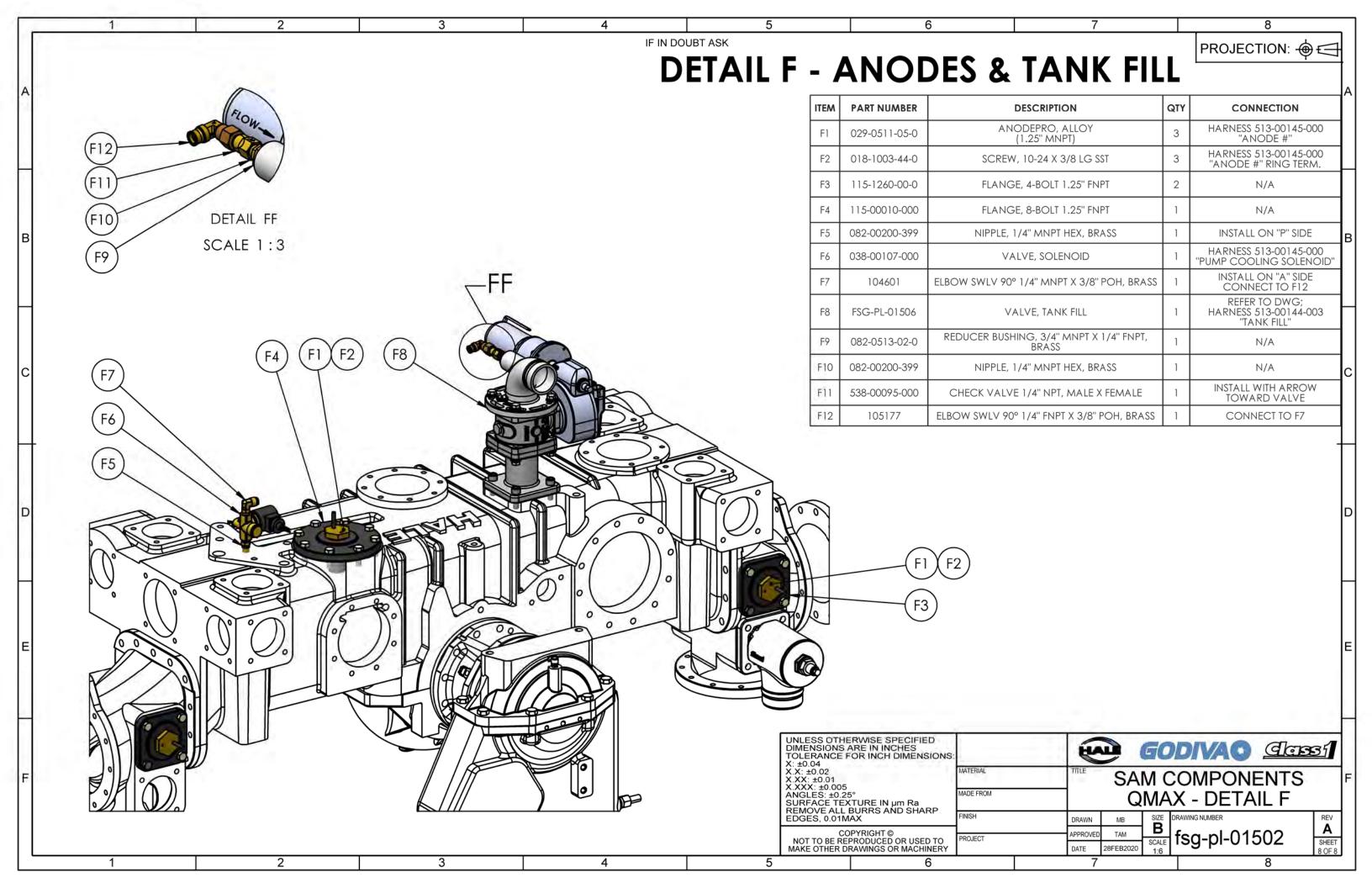












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PROJECT

REVISED SHEET 1 & SHEET LAYOUT

ADDED SHEETS 15-17

N/A

N/A

В

С

AJG 25FEB2020

AJG 04MAR2020

TAM

В

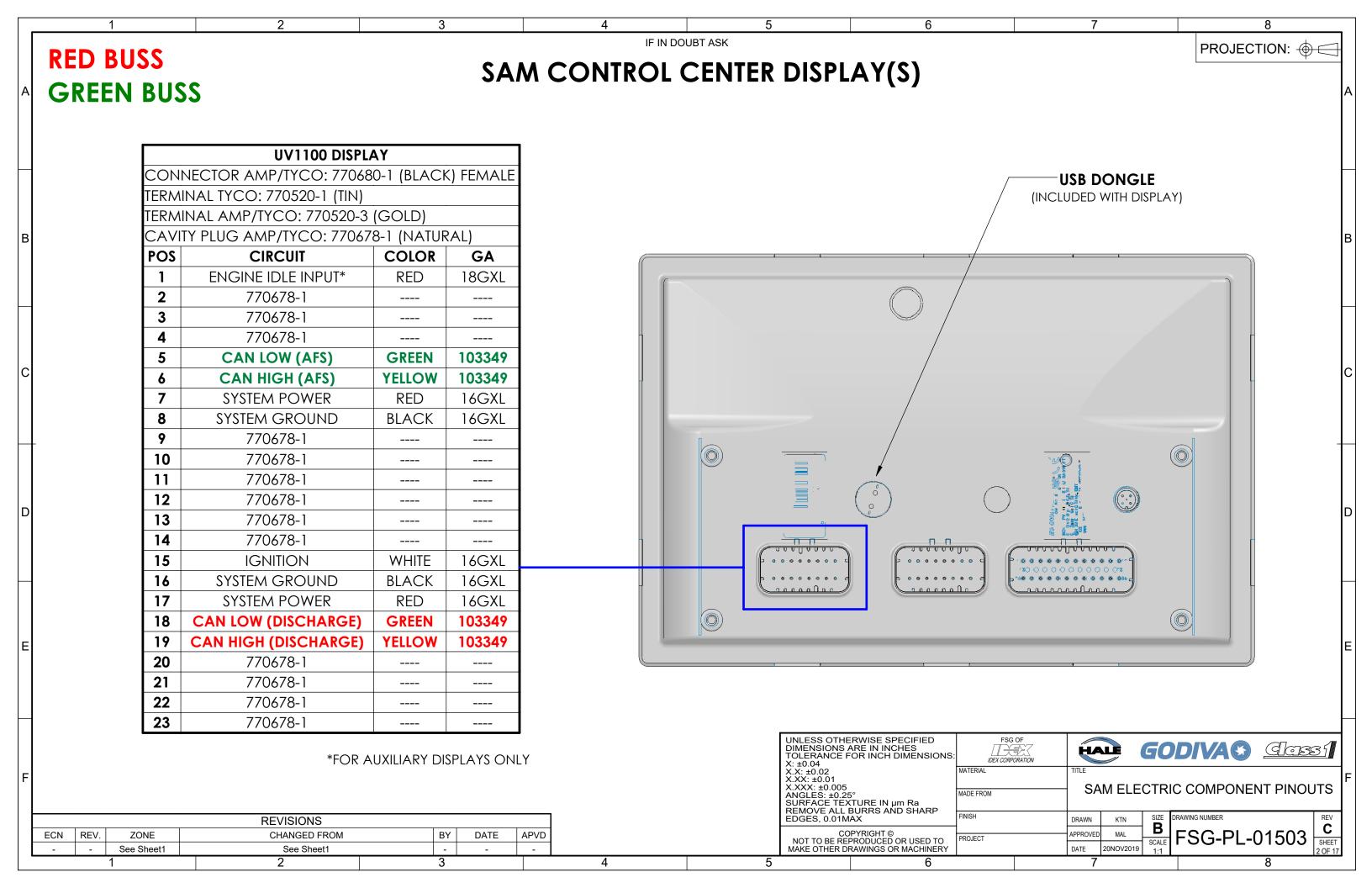
SCALE

20NOV2019

APPROVED

DATE

FSG-PL-01503



IF IN DOUBT ASK

GREEN BUSS BLUE BUSS

PUMP GOVERNOR CONTROL CENTER

PROJECTION:

UV800 DISPLAY

CONNECTOR AMP/TYCO: 770680-1 (BLACK) FEMALE

TERMINAL TYCO: 770520-1 (TIN)

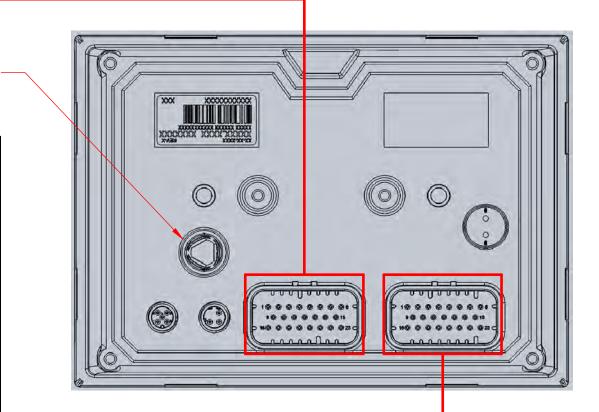
TERMINAL AMP/TYCO: 770520-3 (GOLD)

CAVITY	PLUG AMP/TYCO: 770678	B-1 (NATURAI	_)
POS	CIRCUIT	COLOR	GA
1	770678-1		
2	770678-1		
3	770678-1		
4	770678-1		
5	CAN LOW (CHASSIS)	GREEN	103349
6	CAN HIGH (CHASSIS)	YELLOW	103349
7	SYSTEM POWER	RED	16GXL
8	SYSTEM GROUND	BLACK	16GXL
9	770678-1		
10	770678-1		
11	770678-1		
12	770678-1		
13	770678-1		
14	770678-1		
15	IGNITION	WHITE	16GXL
16	SYSTEM GROUND	BLACK	16GXL
17	SYSTEM POWER	RED	16GXL
18	CAN LOW (AFS)	GREEN	103349
19	CAN HIGH (AFS)	YELLOW	103349
20	770678-1		
21	770678-1		
22	BUZZER ALARM OUTPUT	BLACK	18GXL
23	770678-1		

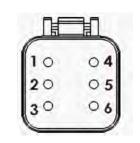
USB DONGLE

(INCLUDED WITH DISPLAY)

	UV800 AUDIO/VIDEO							
CON	CONNECTOR AMP/TYCO: 770680-5 (BLUE) FEMALE							
	NAL TYCO: 770520-1 (TIN)	,						
CAVI	TY PLUG AMP/TYCO: 77067	8-1 (NATUR	AL)					
POS	CIRCUIT	GA						
1	770678-1							
2	770678-1							
3	770678-1							
4	770678-1							
5	VIDEO INPUT 3 POS	BROWN	18GXL					
6	VIDEO INPUT 2 POS	YELLOW	18GXL					
7	VIDEO INPUT 1 POS	WHITE	18GXL					
8	770678-1							
9	770678-1							
10	770678-1							
11	770678-1							
12	VIDEO INPUT 3 NEG	GREEN	18GXL					
13	VIDEO INPUT 2 NEG	GREEN	18GXL					
14	VIDEO INPUT 1 NEG	GREEN	18GXL					
15	770678-1							
16	AUDIO 1 OUT LEFT POS	WHITE	18GXL					
17	AUDIO 1 OUT LEFT NEG	BLACK	18GXL					
18	AUDIO 1 OUT RIGHT POS	RED	18GXL					
19	AUDIO 1 OUT RIGHT NEG	BLACK	18GXL					
20	770678-1							
21	770678-1							
22	770678-1							
23	770678-1							



TWISTE		
	R	
CTOR DEUTSCH: DTO	6-6S (GREY)
EUTSCH: W6S (ORA)	vGE)	
EUTSCH: 0462-0201-1	6131	
CIRCUIT	COLOR	GA
SYSTEM POWER	YELLOW	16GXL
SYSTEM GROUND	BLACK	16GXL
INTERLOCK	WHITE	16GXL
CAN HIGH (AFS)	YELLOW	103349
CAN LOW (AFS)	GREEN	103349
CAN SHIELD (AFS)	BLACK	103349
	EUTSCH: W6S (ORAN EUTSCH: 0462-0201-1 CIRCUIT SYSTEM POWER SYSTEM GROUND INTERLOCK CAN HIGH (AFS) CAN LOW (AFS)	SYSTEM POWER SYSTEM GROUND SYSTEM GROUND INTERLOCK WHITE CAN HIGH (AFS) CAN LOW (AFS) GREEN



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCH DIMENSIONS: X: ±0.04
X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005
ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX
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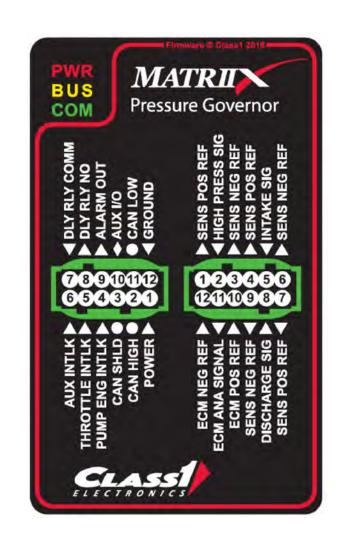
FSG OF IDEX CORPORATION	Y		50	DIVAG	<u>Acs</u>	<u>3</u> [
MATERIAL MADE FROM	TITLE	M ELE	CTR	C COMPONEI	NT PINOL	JTS
FINISH	DRAWN	KTN	SIZE	DRAWING NUMBER		REV
PROJECT	APPROVED	MAL	В	FSG-PL-(11503	C
	DATE	20NOV2019	SCALE 1:1		3 1 3 0 3	SHEET 3 OF 1

	REVISIONS						l	
ECN	REV.	ZONE	CHANGED FROM BY DATE AP				APVD	
-	-	See Sheet1	See Sheet1			-		
		1	2					

MATRIX PUMP PRESSURE GOVERNOR MODULE

	MATRIX GOVERNOR MODULE "A"						
CON	CONNECTOR DEUTSCH: DTM06-12SA (GREY)						
LOC	K DEUTSCH: WM-12S (ORA	ANGE)					
TERM	1 DEUTSCH: 0462-0201-201	141 (18-16	5)				
TERM	1 DEUTSCH: 0462-0201-203	31 (GOLD)				
POS	CIRCUIT	COLOR	GA				
1	SYSTEM POWER	RED	16GXL				
2	CAN HIGH (CHASSIS)	YELLOW	103349				
3	CAN SHIELD (CHASSIS)	BLACK	18GXL				
4	PUMP ENGAGED	WHITE	16GXL				
5	THROTTLE READY	WHITE	16GXL				
6	OEM AUX	YELLOW	16GXL				
7	0413-204-2005						
8	0413-204-2005						
9	0413-204-2005						
10	0413-204-2005						
11 CAN LOW (CHASSIS) GREEN 103349							
12	SYSTEM GROUND	BLACK	16GXL				

BLUE BUSS



MATRIX GOVERNOR MODULE "B"					
CON	NNECTOR DEUTSCH: DTM	106-12SB (I	BLACK)		
LOC	K DEUTSCH: WM-12S (O	RANGE)			
TERA	л DEUTSCH: 0462-0201-2	0141 (18-1	6)		
POS	CIRCUIT	COLOR	GA		
1	0413-204-2005				
2	0413-204-2005				
3	0413-204-2005				
4	INTAKE POS REF	RED	BEL9364		
5	INTAKE SIG REF	WHITE	BEL9364		
6	INTAKE NEG REF	BLACK	BEL9364		
7	DISCHARGE POS REF	RED	BEL9364		
8	DISCHARGE SIG REF	WHITE	BEL9364		
9	DISCHARGE NEG REF	BLACK	BEL9364		
10	0413-204-2005				
11	0413-204-2005				
12	0413-204-2005				

PROJECTION:

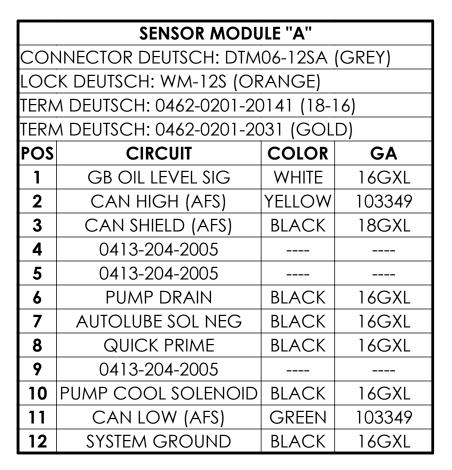
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCH DIMENSIONS: X: ±0.04	FSG OF IDEX CORPORATION	W.		G C	DDIVAG (<u> Aca</u>	<u>31</u>
X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP	MADE FROM	TITLE	M ELE	CTR	IC COMPONENT	PINOL	JTS
EDGES, 0.01MAX	FINISH	DRAWN	KTN	SIZE	DRAWING NUMBER		REV
COPYRIGHT ©	PDO IFOT	APPROVED	MAL	В	FSG-PL-01	5 02	U
NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY	PROJECT	DATE	20NOV2019	SCALE 1:1		503	SHEET 4 OF 17

REVISIONS CHANGED FROM APVD ECN REV. ZONE DATE See Sheet1 See Sheet1

IF IN DOUBT ASK

SENSOR MODULE

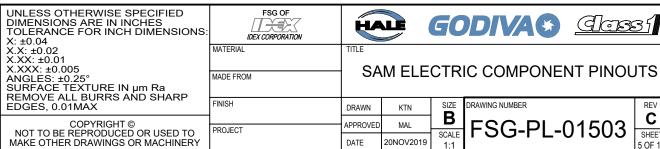
PROJECTION: 🔷 🧲



GREEN BUSS



	SENSOR MODULE "B"						
CON	NNECTOR DEUTSCH: DTA	106-12SB (E	BLACK)				
LOC	K DEUTSCH: WM-12S (O	RANGE)					
TERA	л DEUTSCH: 0462-0201-2	0141 (18-1	6)				
TERA	л DEUTSCH: 0462-0201-2	031 (GOLE))				
POS	CIRCUIT	COLOR	GA				
1	ANODE 1	GREY	16GXL				
2	ANODE 2	GREY	16GXL				
3	ANODE 3	GREY	16GXL				
4	GB WATER IN OIL SIG	WHITE	16GXL				
5	PRIMER INPUT	RED	16GXL				
6	0413-204-2005						
7	BAROMETER +5V REF	RED	16GXL				
8	BAROMETER GND REF	BLACK	16GXL				
9	A/L WATER IN OIL SIG	WHITE	16GXL				
10	BAROMETER SIGNAL	WHITE	16GXL				
11	GB OIL TEMP GREEN 16GXL						
12	SUCTION WATER TEMP	ORANGE	16GXL				



			REVISIONS				
ECN	REV.	ZONE	CHANGED FROM			DATE	APVD
-	-	See Sheet1	See Sheet1			1	-
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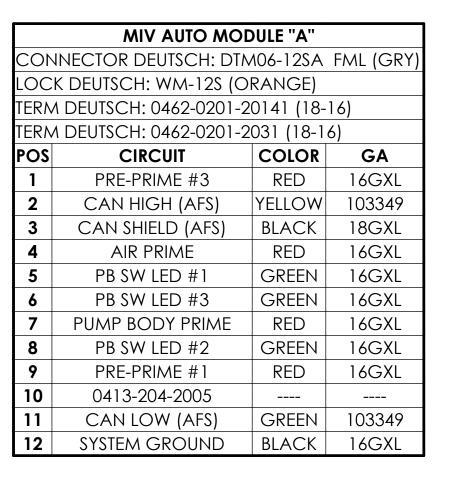
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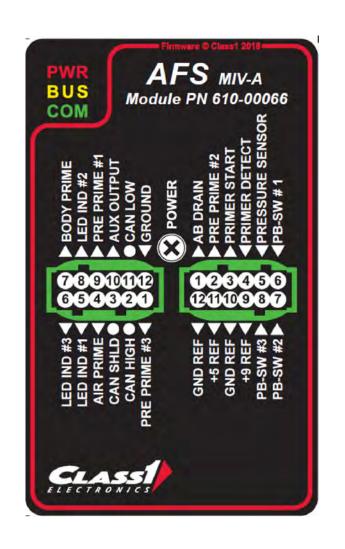
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IF IN DOUBT ASK PROJECTION: 🔷 🧲

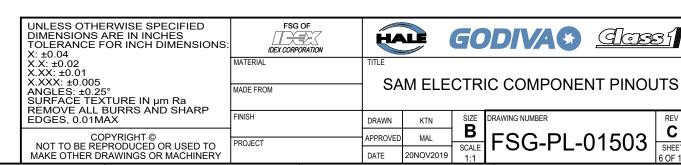
GREEN BUSS

MIV-A MODULE





	MIV AUTO MODULE "B"					
CON	NNECTOR DEUTSCH: DTM	106-12SB	FML (BLK)			
LOC	K DEUTSCH: WM-12S (O	RANGE)				
TERA	л DEUTSCH: 0462-0201-2	0141 (18-	-16)			
TERA	л DEUTSCH: 0462-0201-2	031 (18-1	6)			
POS	CIRCUIT	COLOR	GA			
1	AB DRAIN	RED	16GXL			
2	PRE-PRIME #2	RED	16GXL			
3	PRIMER START	RED	16GXL			
4	WTR IN PRIMER DETECT	WHITE	16GXL			
5	WTR COLUMN SIGNAL	WHITE	BEL9364			
6	SW-1 MOMENTARY	RED	16GXL			
7	SW-2 MOMENTARY	RED	16GXL			
8	SW-3 MOMENTARY	RED	16GXL			
9	0413-204-2005					
10	0413-204-2005					
11	+5V REF	RED	BEL9364			
12	-5V REF	BLACK	BEL9364			



C

	REVISIONS					
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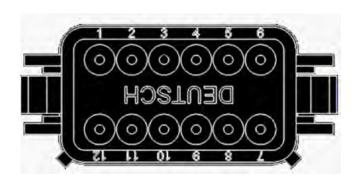
IF IN DOUBT ASK

PROJECTION:

OCCUPANCE OF THE PROJECTION OF THE P

GREEN BUSS

ITL40 WATER LEVEL							
CONI	CONNECTOR DEUTSCH: DT06-12SB (BLACK)						
LOCK	DEUTSCH: W12S (ORAN	GE)					
TERM	DEUTSCH: 0462-0201-16	141					
POS	CIRCUIT	COLOR	GA				
1	SYSTEM POWER	RED	16GXL				
2	CAN HIGH (AFS)	YELLOW	103349				
3	CAN SHIELD (AFS)	BLACK	18GXL				
4	114017						
5	XDCR POSITIVE REF	RED	BEL9364				
6	XDCR SIGNAL REF	WHITE	BEL9364				
7	XDCR GROUND REF	BLACK	BEL9364				
8	DRIVER MODULE GND	BLACK	16GXL				
9	114017						
10	114017						
11	CAN LOW (AFS)	GREEN	103349				
12	SYSTEM GROUND	BLACK	16GXL				



AKRON VALVE (NON-DISCHARGE)

VALVES: TANK FILL, TANK-TO-PUMP, INTAKE

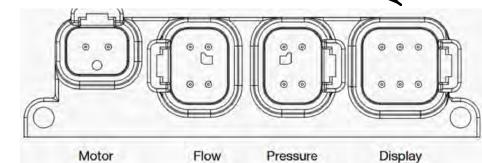
CONNECTOR DEUTSCH: DT06-6S (GREY)

LOCK DEUTSCH: W6S (ORANGE)

TERM DEUTSCH: 0462-0201-161 (20-16) GOLD

TERM DEUTSCH: 0462-0209-16141 (16-14) TIN

	DE010011.0102 020	, , , , , , , , , , , , , , , , , , , ,	O 1 1, 111 \
POS	CIRCUIT	COLOR	GA
1	CAN HIGH (AFS)	YELLOW	103349
2	CAN SHIELD (AFS)	BLACK	18GXL
3	SYSTEM GROUND	BLACK	14GXL
4	SYSTEM POWER	RED	14GXL
5	114017		
6	CAN LOW (AFS)	GREEN	103349





AKRON VALVE PRESSURE/FLOW

CONNECTOR DEUTSCH: DT06-4S-E008 (GREY)

LOCK DEUTSCH: W4SA-P012 (GREY)

TERM DEUTSCH: 0462-0201-1631 (GOLD)*
TERM DEUTSCH: 0462-0209-16141 (TIN)

12KW B2010011: 0 102 0207 101 11 (1114)				
POS	CIRCUIT	COLOR	GA	
1	SIGNAL	WHITE	BEL9364	
2	SHIELD*	DRAIN	BEL9364	
3	POWER (-)	BLACK	BEL9364	
4	POWER (+)	RED	BEL9364	



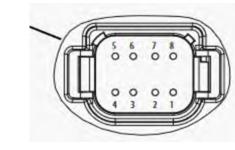
VALVES: TANK FILL, TANK-TO-PUMP, INTAKE CONNECTOR DEUTSCH: DT06-6S (GREY)

LOCK DEUTSCH: W8S (ORANGE)

TERM DEUTSCH: 0462-0201-1631 (18) GOLD

TERM DEUTSCH: 0462-0209-16141 (14) TIN

IEKIV	1 DEUISCH, 0462-0209-1612	+1 (1 <i>4)</i> 1119	
POS	CIRCUIT	COLOR	GA
1	114017		
2	CAN HIGH (DISCH.)	YELLOW	18GXL
3	GROUND OUT	WHITE	14GXL
4	GROUND IN	VIOLET	14GXL
5	BATTERY VOLTAGE IN	GREEN	14GXL
6	BATTERY VOLTAGE OUT	YELLOW	14GXL
7	CAN LOW (DISCH.)	GREEN	18GXL
8	114017		



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCH DIMENSIONS: X: ±0.04 X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX	N F
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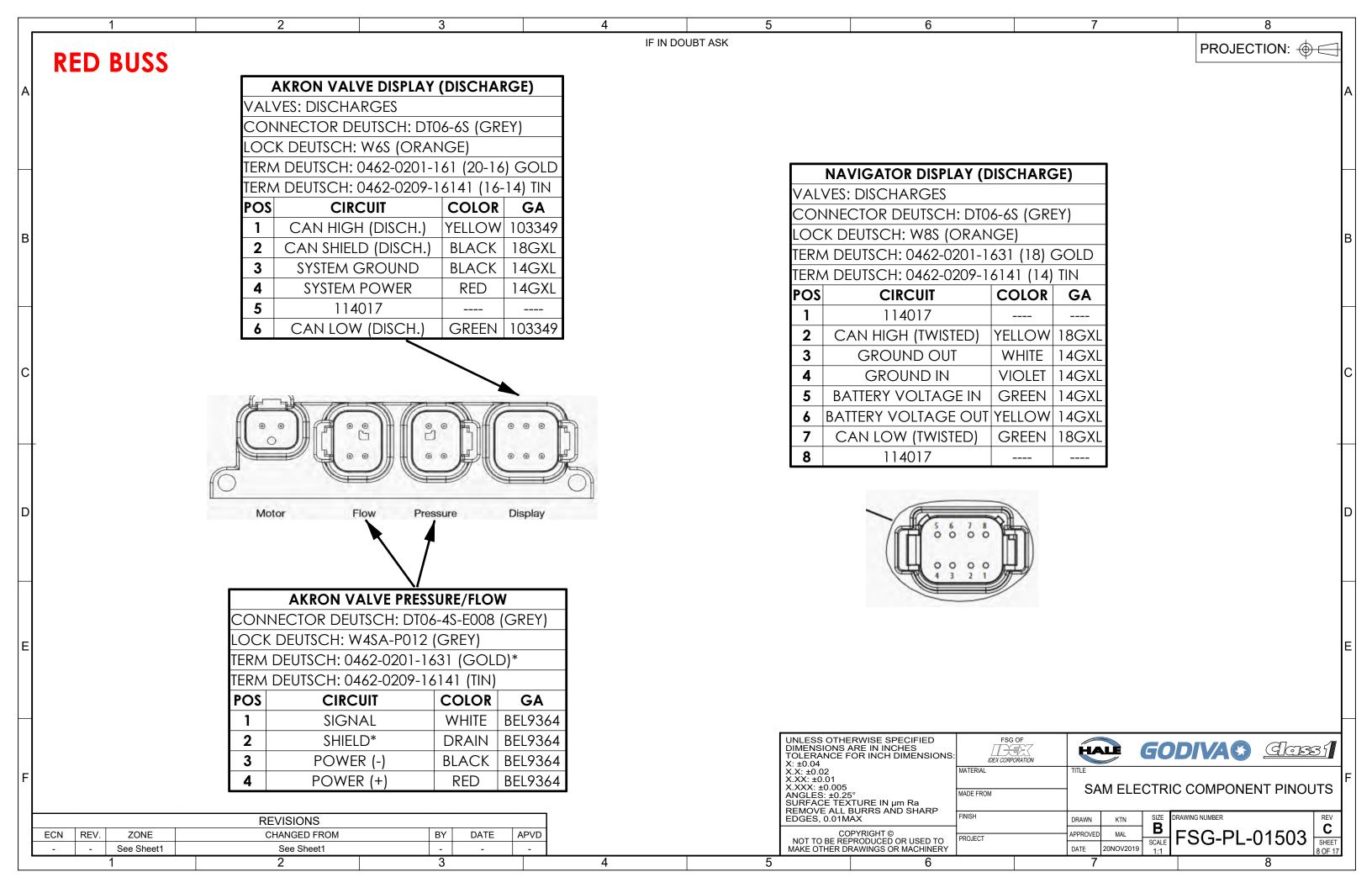
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MATERIAL	TITLE					
MADE FROM	SA	M ELE	CTR	IC COMPONE	NT PINOL	JTS
FINISH	DRAWN	KTN	SIZE	DRAWING NUMBER		REV
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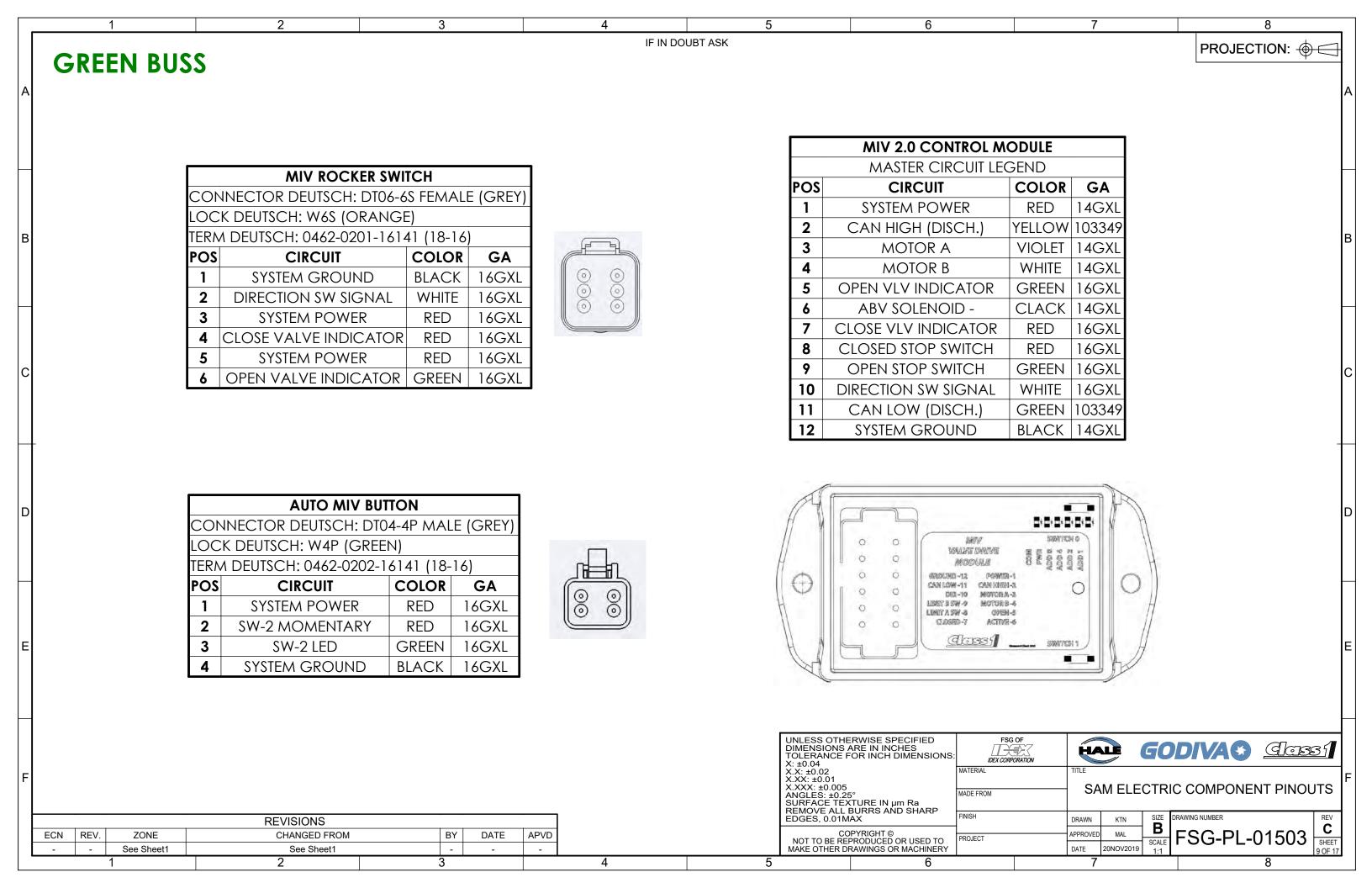
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 See Sheet1

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IF IN DOUBT ASK PROJECTION: 🔷 🥽 WIFI CONNECTION

WIFI POWER SUPPLY (12V)					
CON	CONNECTOR DELPHI: 12010973 BLK (SHROUD)				
TERN	TERMINAL DELPHI: 12124582 MALE (TIN)				
SEAL	SEAL DELPHI: 15324982 GRN (18-16)				
POS	CIRCUIT	COLOR	GA		
1	POWER	RED	18GXL		
2	GROUND	BLACK	18GXL		

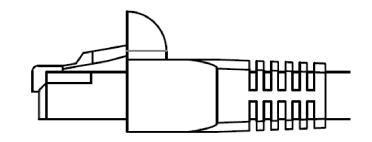


	WIFI POWER SUPPLY (24V)						
CON	CONNECTOR DELPHI: 12103784 GRY (TOWER)						
TERA	TERMINAL DELPHI: 12124580 FEMALE (TIN)						
SEAL	DELPHI: 15324982 GRN	(18-16)					
POS	CIRCUIT	COLOR	GA				
1	1 POWER YELLOW 18GXL						
2	GROUND	BLACK	18GXL				



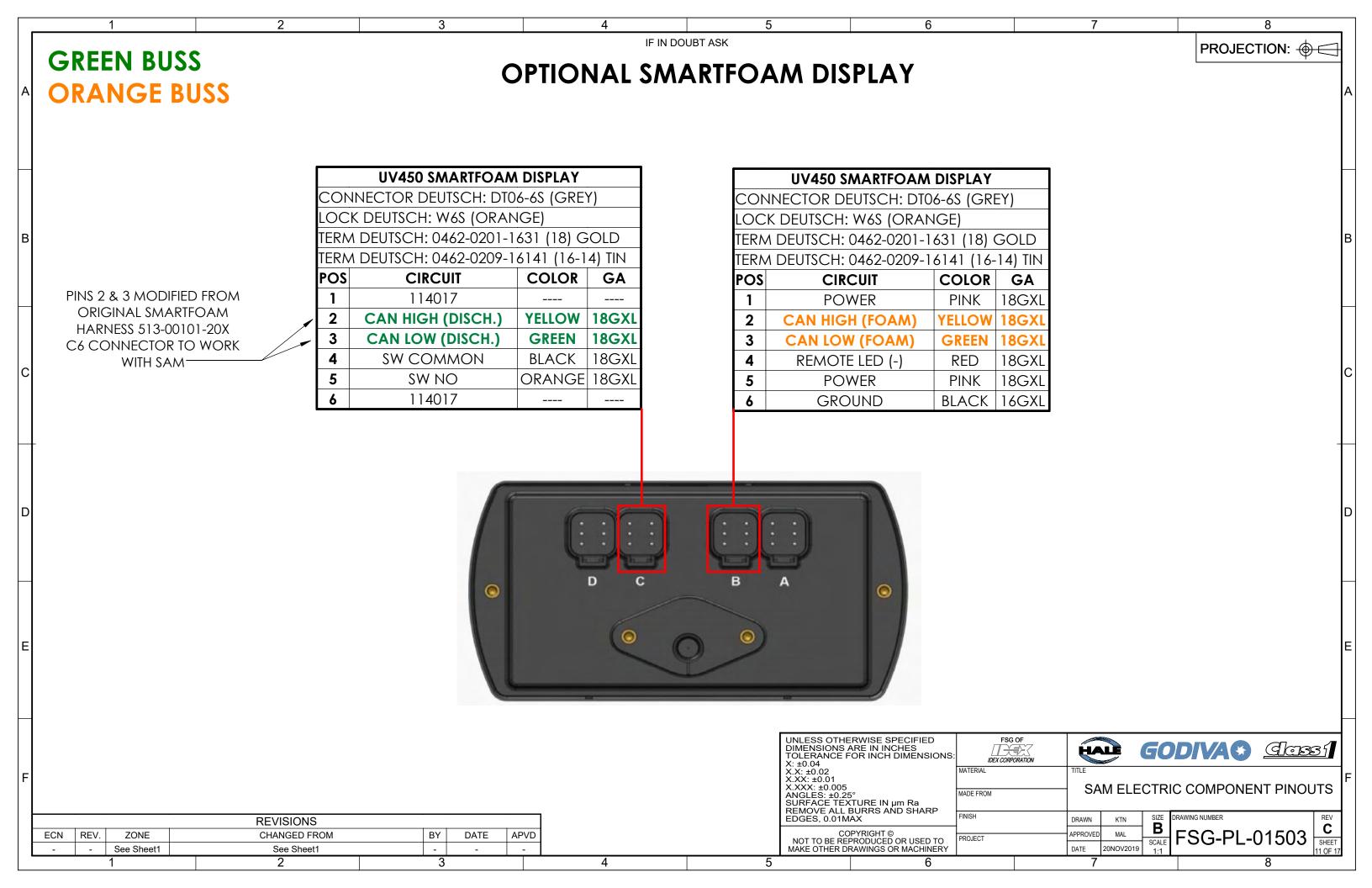
	WIFI ANTENNA							
		CAT6 CABLE						
POS	S CIRCUIT COLOR GA SPL							
1	NO IMPRINT	WHITE/ORANGE	24AWG					
2	NO IMPRINT	ORANGE	24AWG					
3	NO IMPRINT	WHITE/GREEN	24AWG					
4	NO IMPRINT	BLUE	24AWG	SPLPWR				
5	NO IMPRINT	WHITE/BLUE	24AWG	SPLPWR				
6	NO IMPRINT	GREEN	24AWG					
7	NO IMPRINT	WHITE/BROWN	24AWG	SPLGND				
8	NO IMPRINT	BROWN	24AWG	SPLGND				





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X.XXX: ±0.005		\perp \circ Δ	$M \vdash I \vdash$		IC COMPONE	NIT DINI∩I	I PTI
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IF IN DOUBT ASK PROJECTION: 🕁 😅

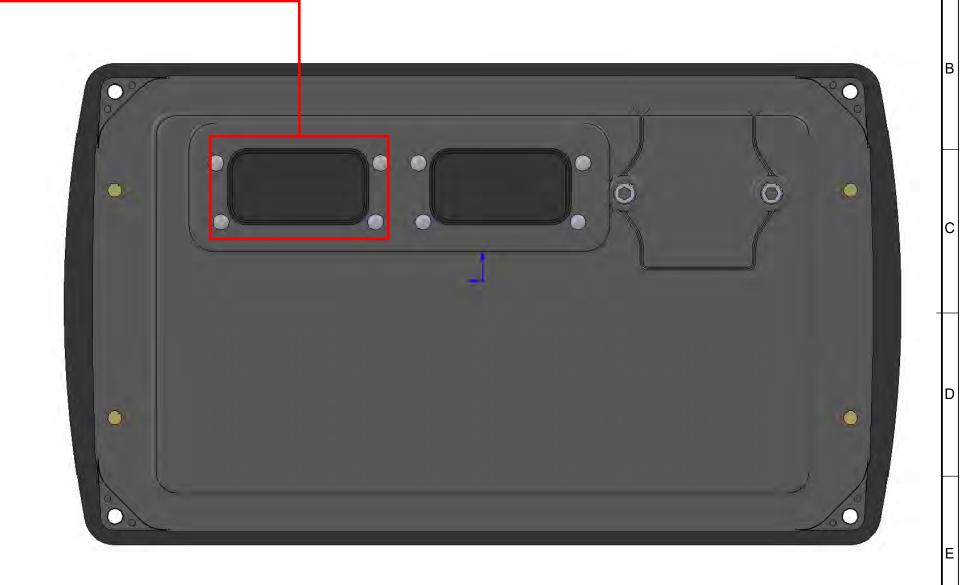
GREEN BUSS ORANGE BUSS

OPTIONAL SMARTCAFS DISPLAY

UV780 SMARTCAFS DISPLAY CONNECTOR AMP/TYCO: 770680-1 (BLACK) FEMALE

TERMINAL TYCO: 770520-1 (TIN)

CAVI	TY PLUG AMP/TYCO: 77067	8-1 (NATUR	RAL)
POS	CIRCUIT	COLOR	GA
1	DIGITAL INPUT #1	RED	18GXL
2	770678-1		
3	770678-1		
4	770678-1		
5	CAN LOW (FOAM)	GREEN	103349
6	CAN HIGH (FOAM)	YELLOW	103349
7	SUPPLY POWER	RED	16GXL
8	SUPPLY GROUND	BLACK	16GXL
9	770678-1		
10	770678-1		
11	770678-1		
12	770678-1		
13	770678-1		
14	770678-1		
15	SUPPLY POWER	RED	16GXL
16	770678-1		
17	770678-1		
18	CAN LOW (DISCH.)	GREEN	103349
19	CAN HIGH (DISCH.)	YELLOW	103349
20	770678-1		
21	770678-1		
22	DIGITAL OUTPUT	BLACK	16GXL
23	770678-1		



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCH DIMENSIONS: X: ±0.04	
X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005	MATER
ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP	MADE
EDGES, 0.01MAX	FINISH
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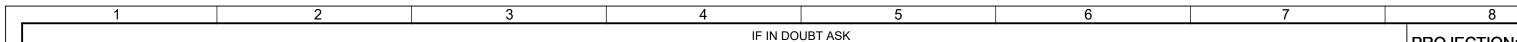
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1	DRAWN	KTN	SIZE	DRAWING NUMBER	REV

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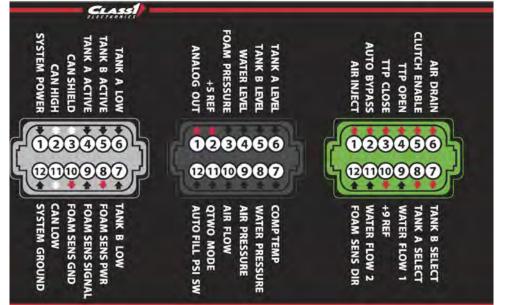
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SHEET 12 OF 17





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REV C SHEET 13 OF 1



FOAM PUMP MOTOR DRIVER MODULE

SMA	SMART FOAM MOTOR DRIVER (GRAY)						
CONN	ECTOR DEUTSCH: DT06-12A (GRAY)						
LOCK I	DEUTSCH: W12S (ORANGE)						
TERM [DEUTSCH: 0462-0209-16141 (TIN)						
TERM D	DEUTSCH: 0462-0201-1631 (GOLD)						
POS	CIRCUIT						
1	system power						
2	CAN HIGH (FOAM)						
3	CAN SHIELD (FOAM)						
4	TANK A ACT/SEL						
5	TANK B ACT/SEL						
6	TANK A LOW						
7	tank b low						
8	FOAM SENSOR POWER						
9	foam sensor signal						
10 FOAM SENSOR GROUND							
11	CAN LOW (FOAM)						
12	system ground						

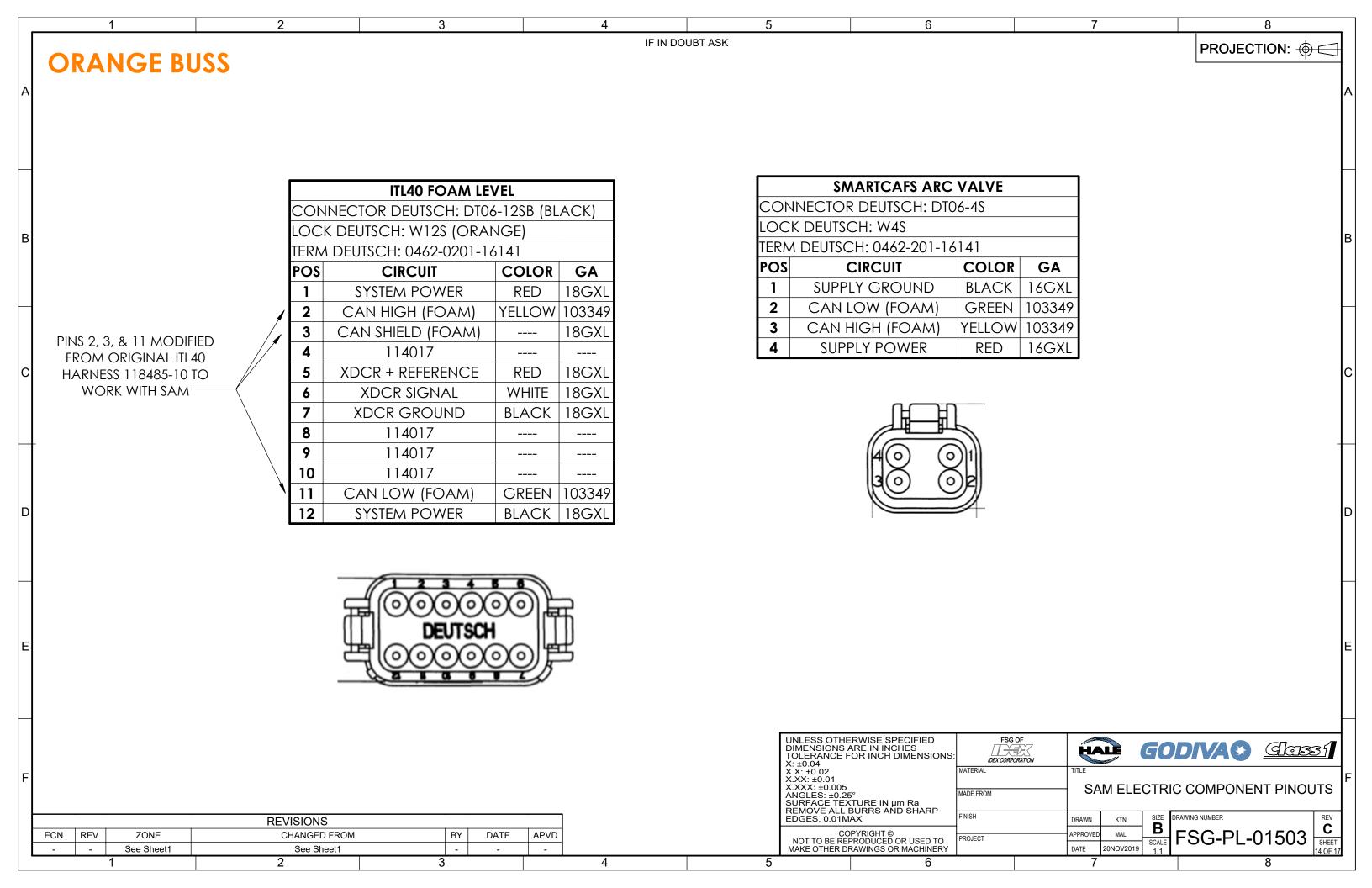
ORANGE BUSS

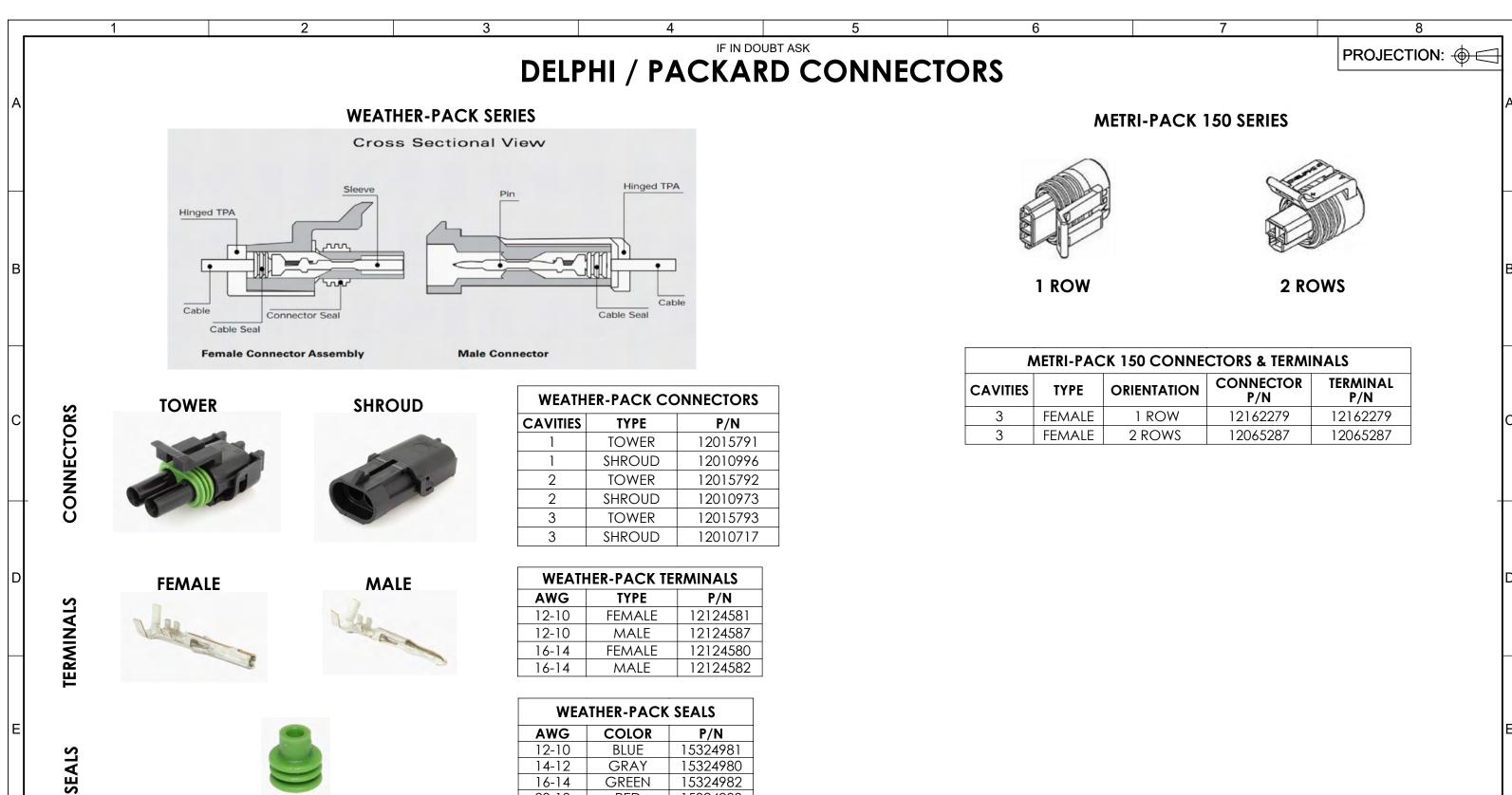
SMAF	SMART FOAM MOTOR DRIVER (BLACK)						
CONNE	CTOR DEUTSCH: DT06-12B (BLACK)						
LOCK D	LOCK DEUTSCH: W12S (ORANGE)						
TERM DI	EUTSCH: 0462-0209-16141 (TIN)						
TERM DI	EUTSCH: 0462-0201-1631 (GOLD)						
POS	CIRCUIT						
1	ANALOG OUT						
2	+5V REF						
3	foam pressure						
4	WATER LEVEL						
5	TANK B LEVEL						
6	TANK A LEVEL						
7	COMP TEMP						
8	WATER PRESSURE						
9	AIR PRESSURE						
10	AIR FLOW						
11	QTWO MODE						
12	AUTOFILL PSI SWITCH						

SMART FOAM MOTOR DRIVER (GREEN)							
CONN	CONNECTOR DEUTSCH: DT06-12C (GRAY)						
LOCK [LOCK DEUTSCH: W12S (ORANGE)						
TERM D	DEUTSCH: 0462-0209-16141 (TIN)						
TERM C	DEUTSCH: 0462-0201-1631 (GOLD)						
POS	CIRCUIT						
1	AIR INJECT						
2	AUTO BYPASS						
3	TTP CLOSE						
4	TTP OPEN						
5	CLUTCH ENABLE						
6	AIR DRAIN						
7	TANK B SELECT						
8	TANK A SELECT						
9	WATER FLOW 1						
10	+9 REF						
11	WATER FLOW 2						
12	foam sens dir						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE FOR INCH DIMENSIONS: HALE **GODIVA** IDEX CORPORATION TOLERANCE FOR INCH DIMENSION X: ±0.04 XX: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP EDGES, 0.01MAX SAM ELECTRIC COMPONENT PINOUTS SIZE **B** COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY FSG-PL-01503 PROJECT SCALE 1:1 20NOV2019 DATE

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WEATHER-PACK PLUG							
AWG	COLOR	P/N					
ALL	GREEN	12010300					

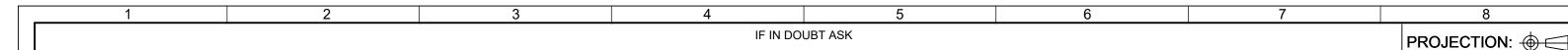
RED

20-18

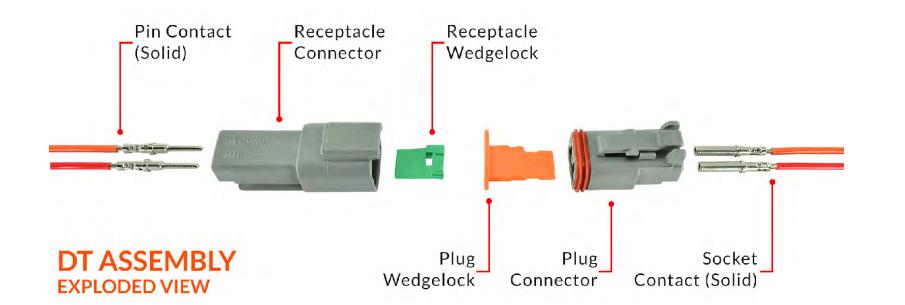
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DEUTSCH CONNECTOR ASSEMBLIES



NOTES FOR DEUTSCH CONNECTOR ASSEMBLIES:

- 1. CONNECTOR STYLES & WIRE SIZES:
 - DT: 16 GA GXL [NOMINAL], WITH 18-14 GA ACCEPTABLE.
 - DTP: 12 GA GXL [NOMINAL], WITH 14-10 GA ACCEPTABLE.
 - DTM: 20 GA GXL [NOMINAL], WITH 20-16 GA ACCEPTABLE.
- 2. FOR 3-CAVITY CONNECTORS, ONLY THE WATER **DETECTOR SENSORS UTILIZE THE -CE02** CONNECTOR MODIFICATION, WHICH PROVIDES REDUCED DIAMETER SEALS.
- 3. ALL CAN NETWORK WIRES UTILIZE GOLD-PLATED TERMINALS, WHICH PROVIDES A HIGHER CURRENT RATING.

	DEUTSCH CONNECTORS & LOCKS									
STYLE	CAVITIES	TYPE	CONNECTOR P/N	LOCK P/N	NOTES					
DT	2	PLUG	DT06-2S	W2S						
DT	2	RECEPTACLE	DT04-2P	W2P						
DT	3	PLUG	DT06-3S & DT06-3S-CE02	W3S	NOTE 2					
DT	3	RECEPTACLE	DT04-3P	W3P						
DTP	4	PLUG	DTP06-4S-CE02	WP-4S						
DT	4	RECEPTACLE	DT04-4P	W4P						
DT	6	PLUG	DT06-6S	W6S						
DT	8	RECEPTACLE	DT04-08PA	W8P						
DT	12	PLUG	DT06-12S	W12S						
DTM	12	RECEPTACLE - A	DTM04-12PA	WM-12P						
DTM	12	RECEPTACLE - B	DTM04-12PB	WM-12P						
DTM	12	PLUG - A	DTM06-12SA	WM-12S						
DTM	12	PLUG - B	DTM06-12SB	WM-12S						

DEUTSCH TERMINALS							
AWG	TYPE	PLATING	P/N	NOTES			
20	SOCKET	TIN	0462-201-20141				
20	PIN	TIN	0460-202-20141				
20	SOCKET	GOLD	0462-201-2031	NOTE 3			
20	PIN	GOLD	0460-202-2031	NOTE 3			
18-16	SOCKET	TIN	0462-201-16141				
18-16	PIN	TIN	0460-202-16141				
18-16	SOCKET	GOLD	0462-201-1631	NOTE 3			
18-16	PIN	GOLD	0460-202-1631	NOTE 3			
14	SOCKET	TIN	0462-209-16141				
12	SOCKET	TIN	0462-203-12141				

DEUTSCH PLUGS							
STYLE	P/N						
DT	114017						
DTP	114017						
DTM	0413-204-2005						
	•						

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X.X: ±0.02 X.XX: ±0.01 X.XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP	MATERIAL MADE FROM	SA	M ELE	CTR	IC COMPONEI	NT PINOL	JTS
EDGES, 0.01MAX	FINISH	DRAWN	KTN		DRAWING NUMBER		REV
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO	PROJECT	APPROVED	MAL	B	FSG-PL-	01503	SHEET
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CONNECTOR

(BUZZER ALARM)

PROJECTION:

TYCO/AMPSEAL **CONNECTOR ASSEMBLIES**



PARTS	EXP	RESS
CONN	IEC1	CORS

(AUDIO/VIDEO)

RCA SOCKET - P/N 090-265





RIGHT-ANGLE FEMALE DISCONNECT P/N DNFR14250FIB-KD



AMPSEAL CONNECTOR							
CAVITIES	TYPE	CONNECTOR P/N	COLOR				
23	PLUG	770680-5	BLUE				
23	PLUG	770680-1	BLACK				

770680-4

GREY

PLUG

ECN REV.

See Sheet1

AMPSEAL TERMINALS							
AWG	TYPE	PLATING	P/N	NOTES			
20	FEMALE	TIN	770520-1				
20	FEMALE	GOLD	770520-3	NOTE 1			

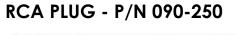
NOTES FOR DEUTSCH CONNECTOR ASSEMBLIES:

REVISIONS

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See Sheet1

1. ALL <u>CAN</u> NETWORK WIRES UTILIZE GOLD-PLATED TERMINALS, WHICH PROVIDES A HIGHER CURRENT RATING.





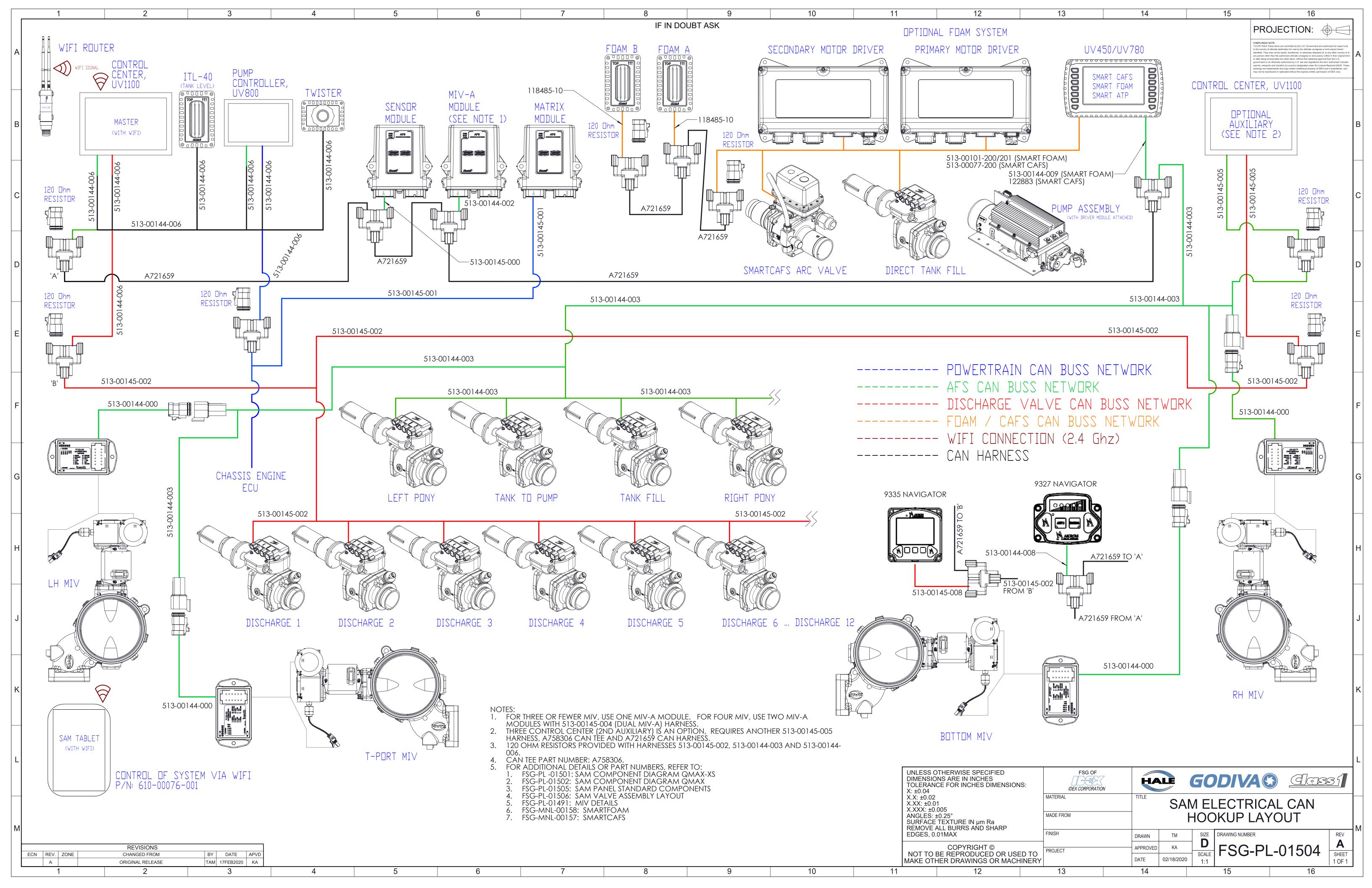


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X.X: ±0.02 X:XX: ±0.01 X:XXX: ±0.005 ANGLES: ±0.25° SURFACE TEXTURE IN µm Ra REMOVE ALL BURRS AND SHARP	MATERIAL MADE FROM	SA	M ELE	CTR	IC COMPONEI	NT PINOL	JTS
EDGES, 0.01MAX	FINISH	DRAWN	KTN	SIZE	DRAWING NUMBER		REV
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY	PROJECT	APPROVED DATE	MAL 20NOV2019	SCALE 1:1	FSG-PL-	01503	SHEET

DATE APVD

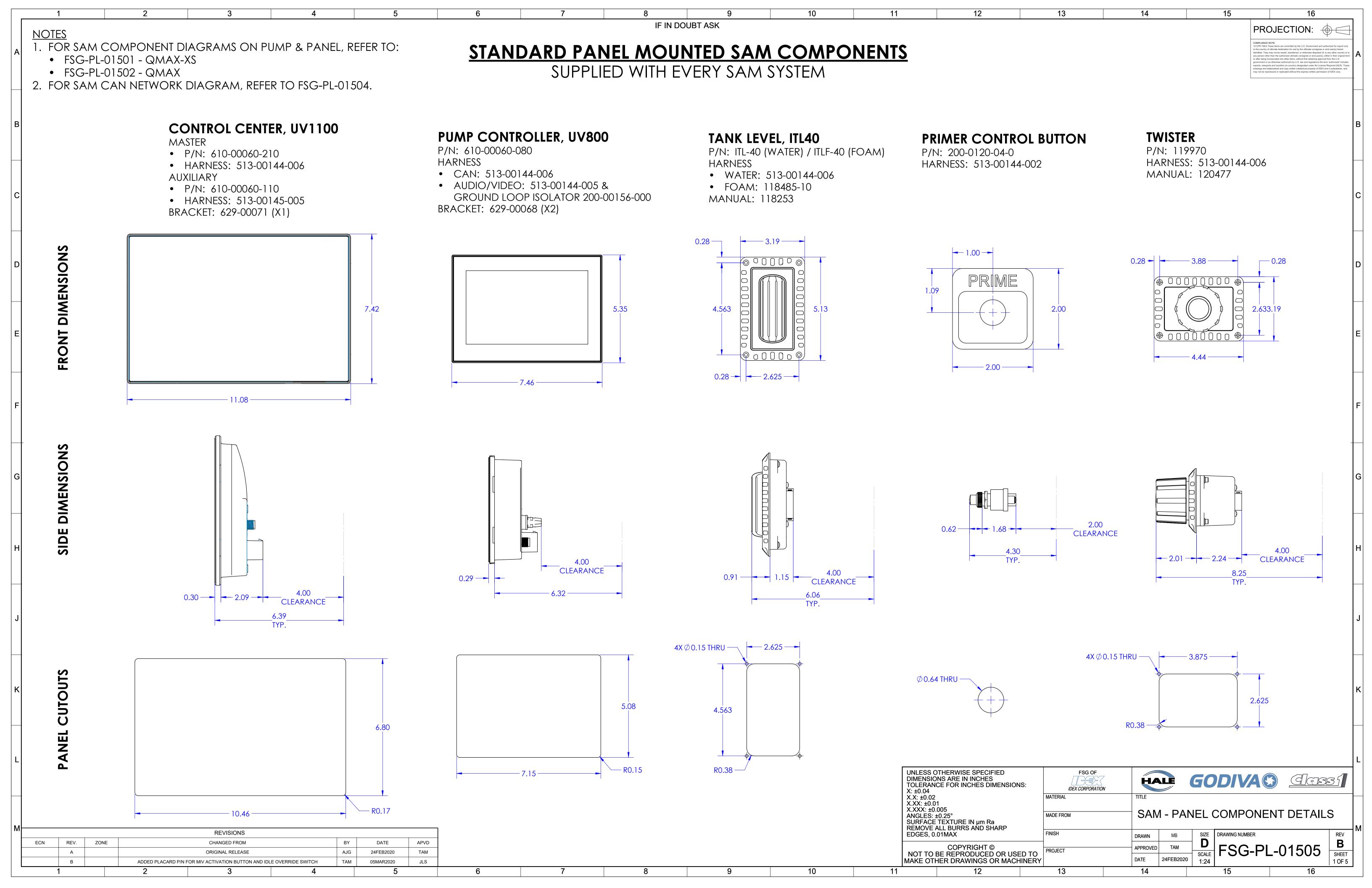


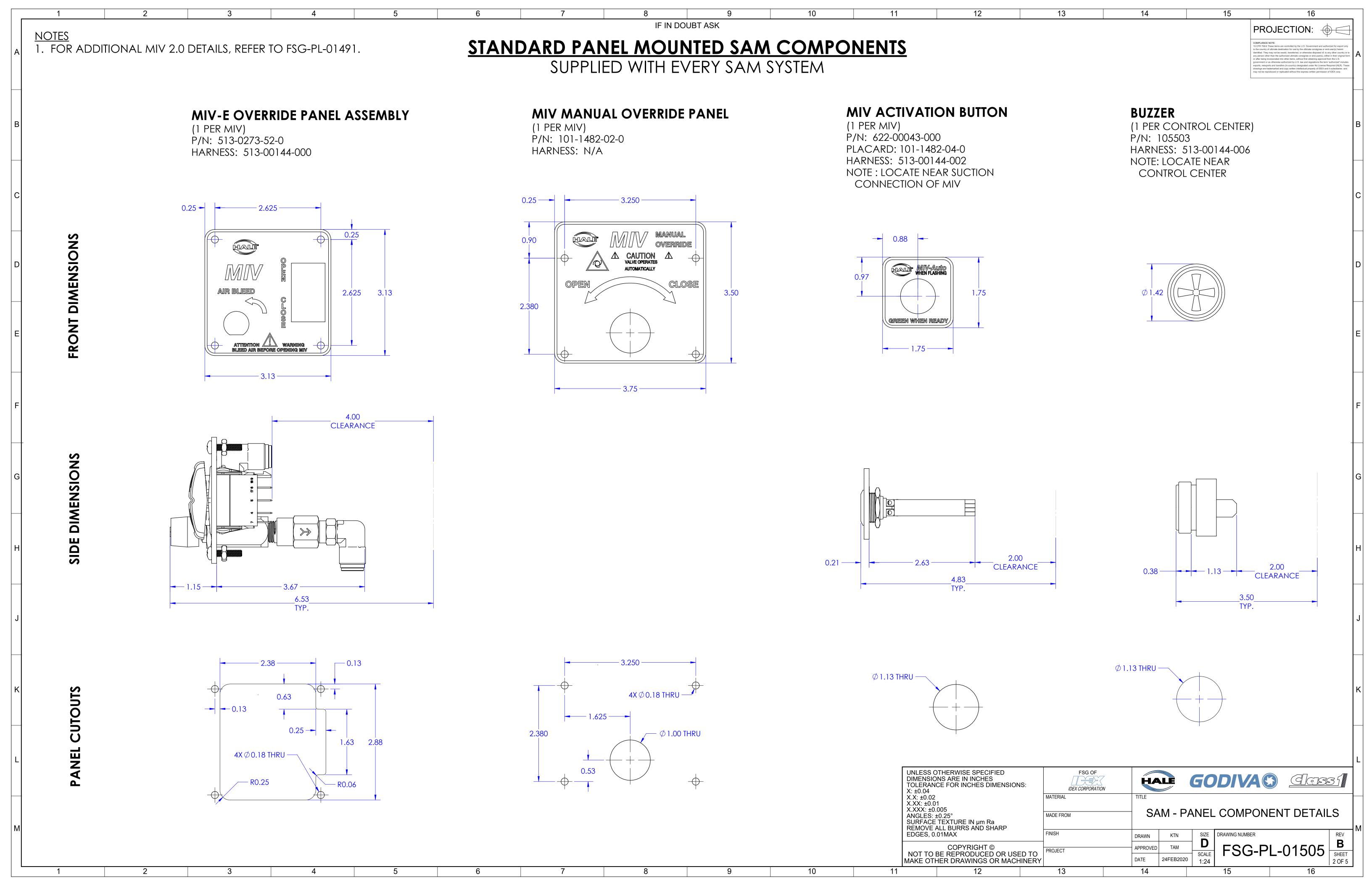
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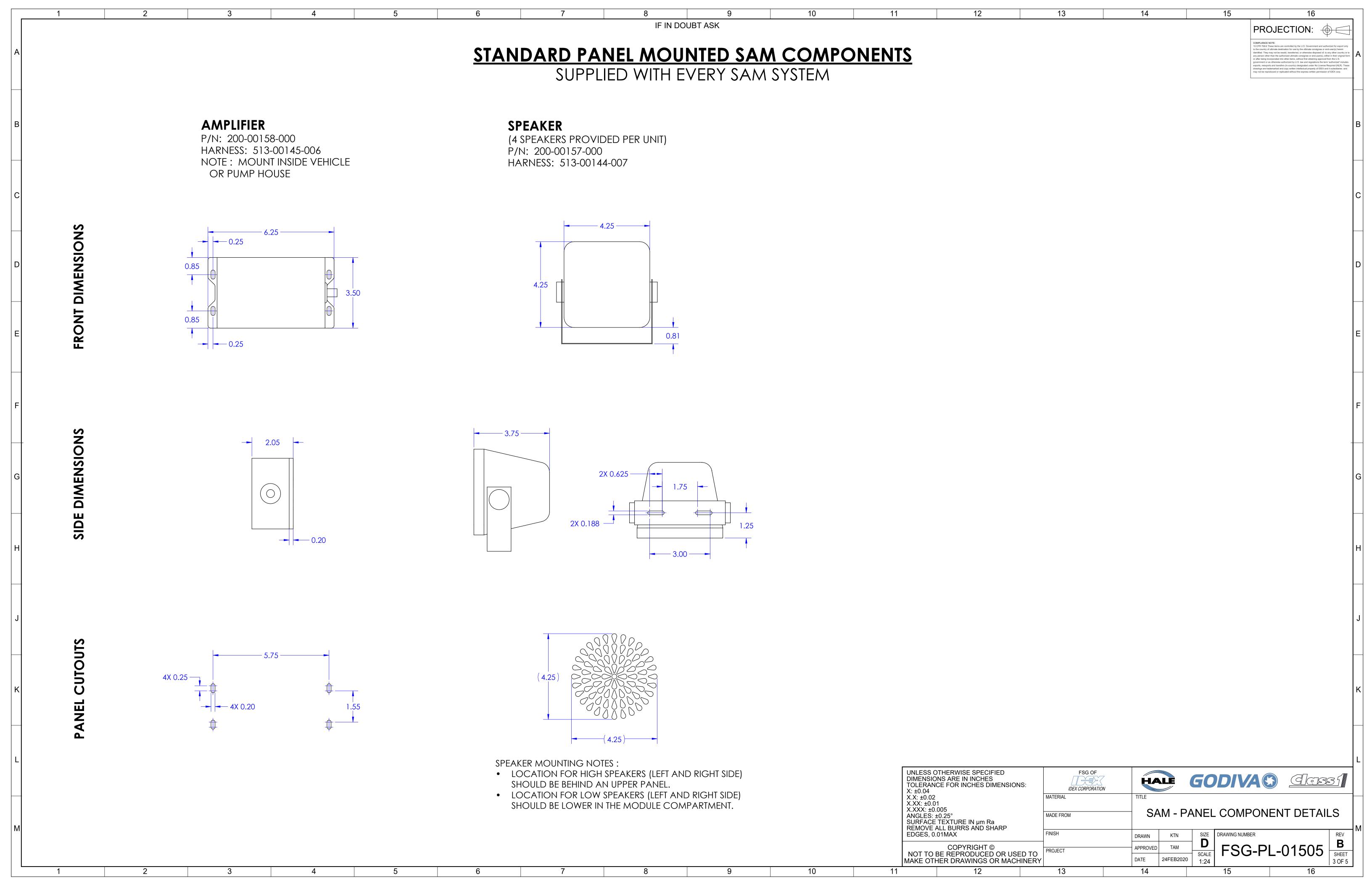


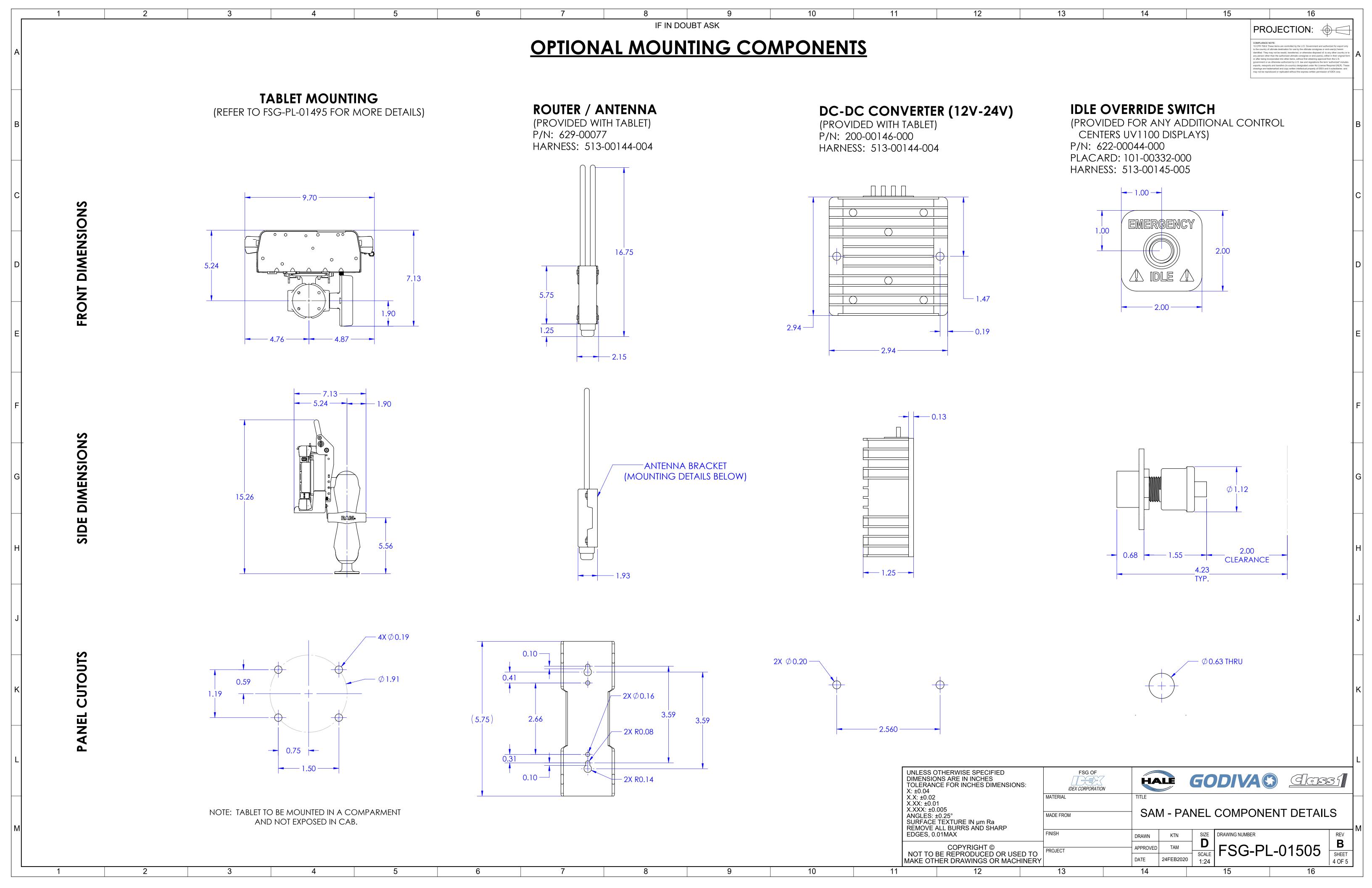


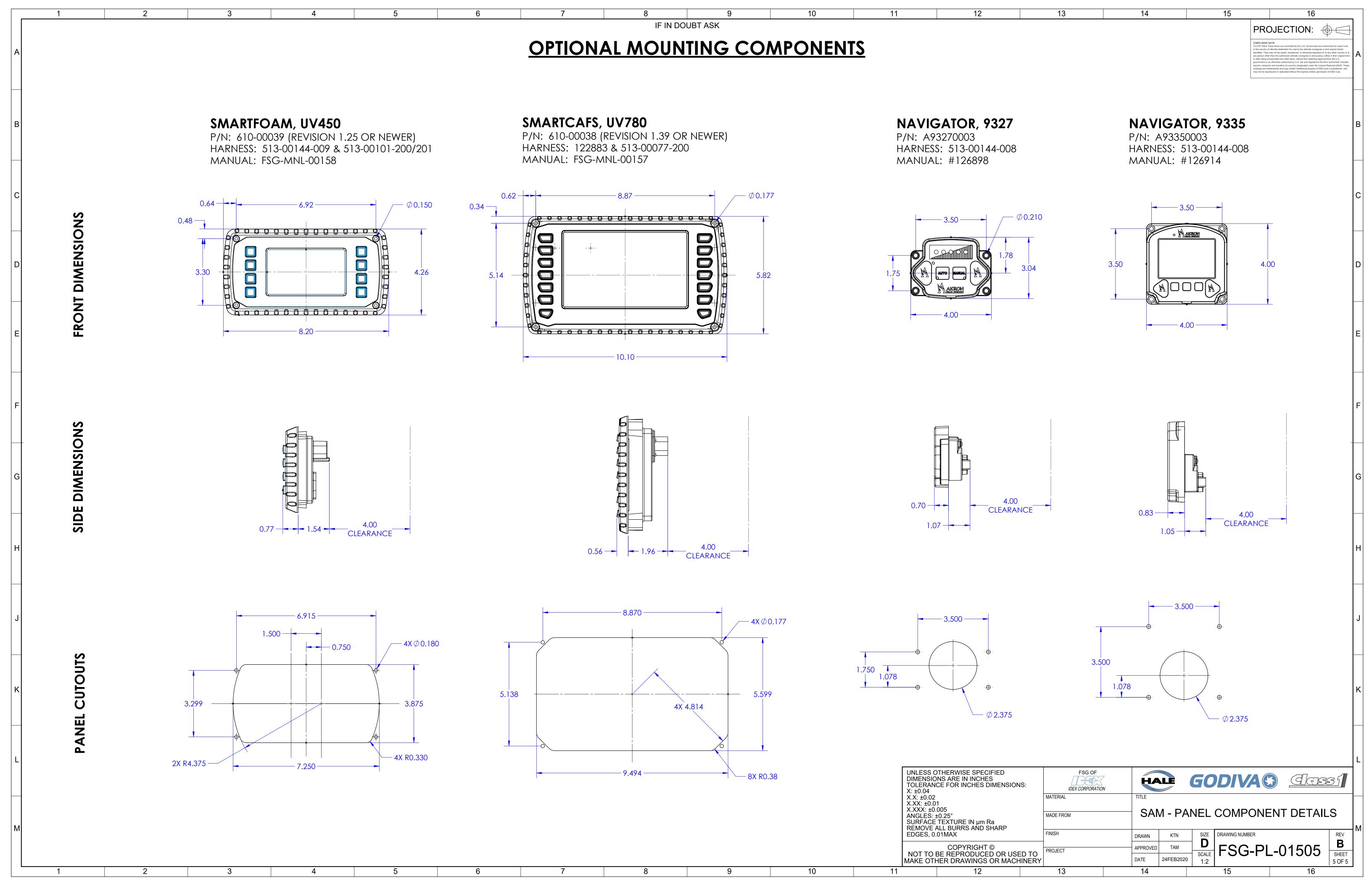
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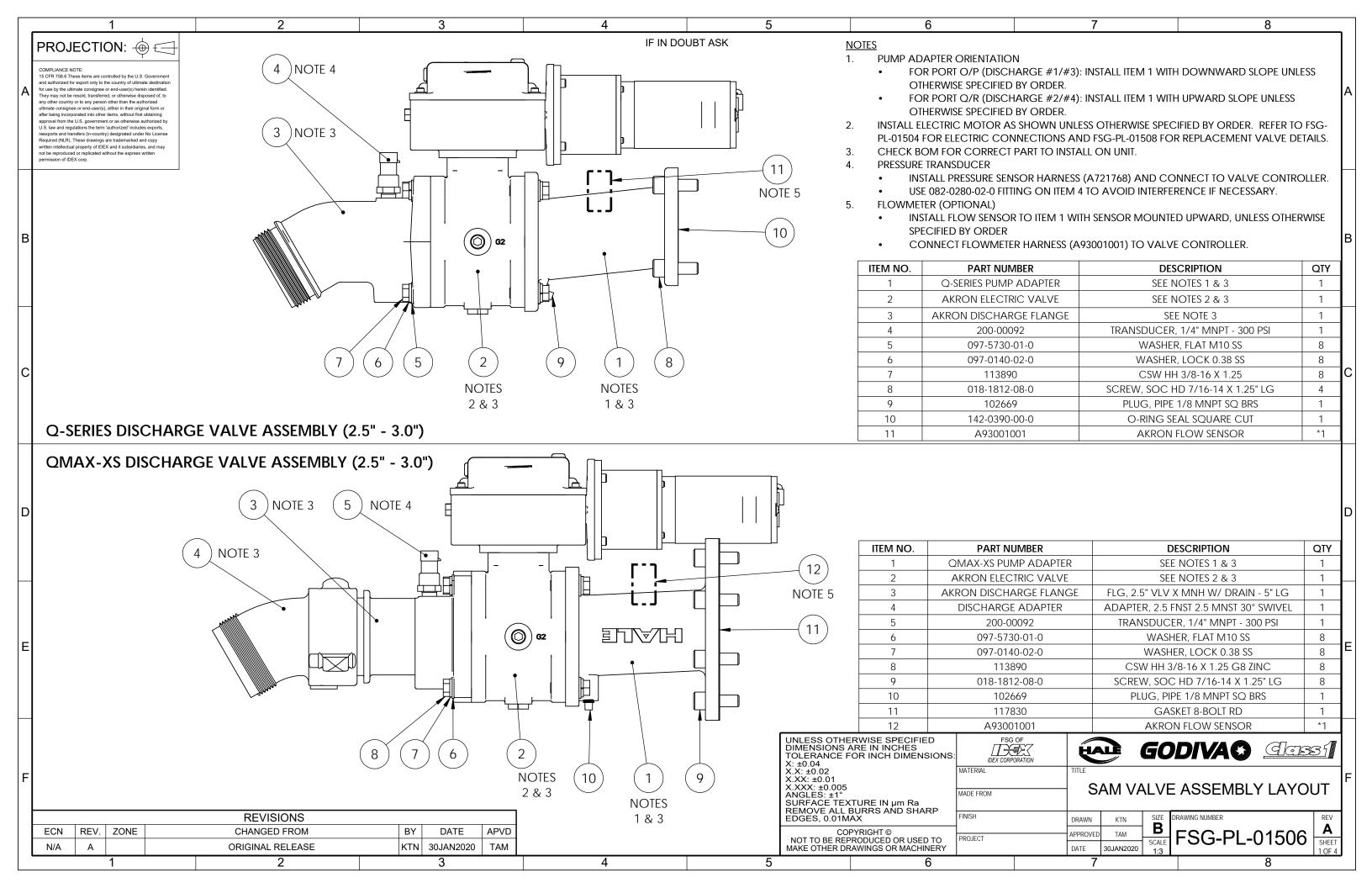


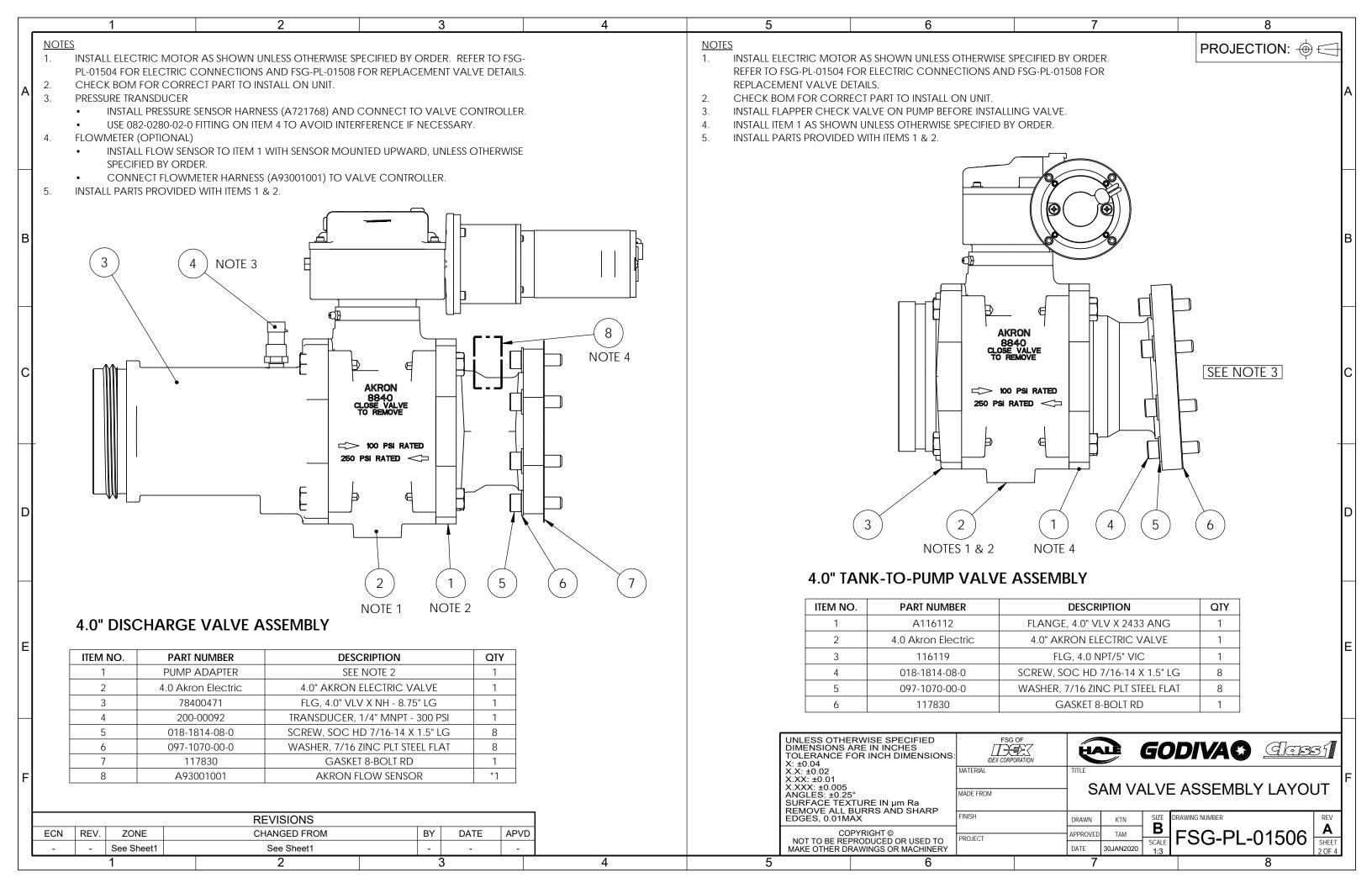


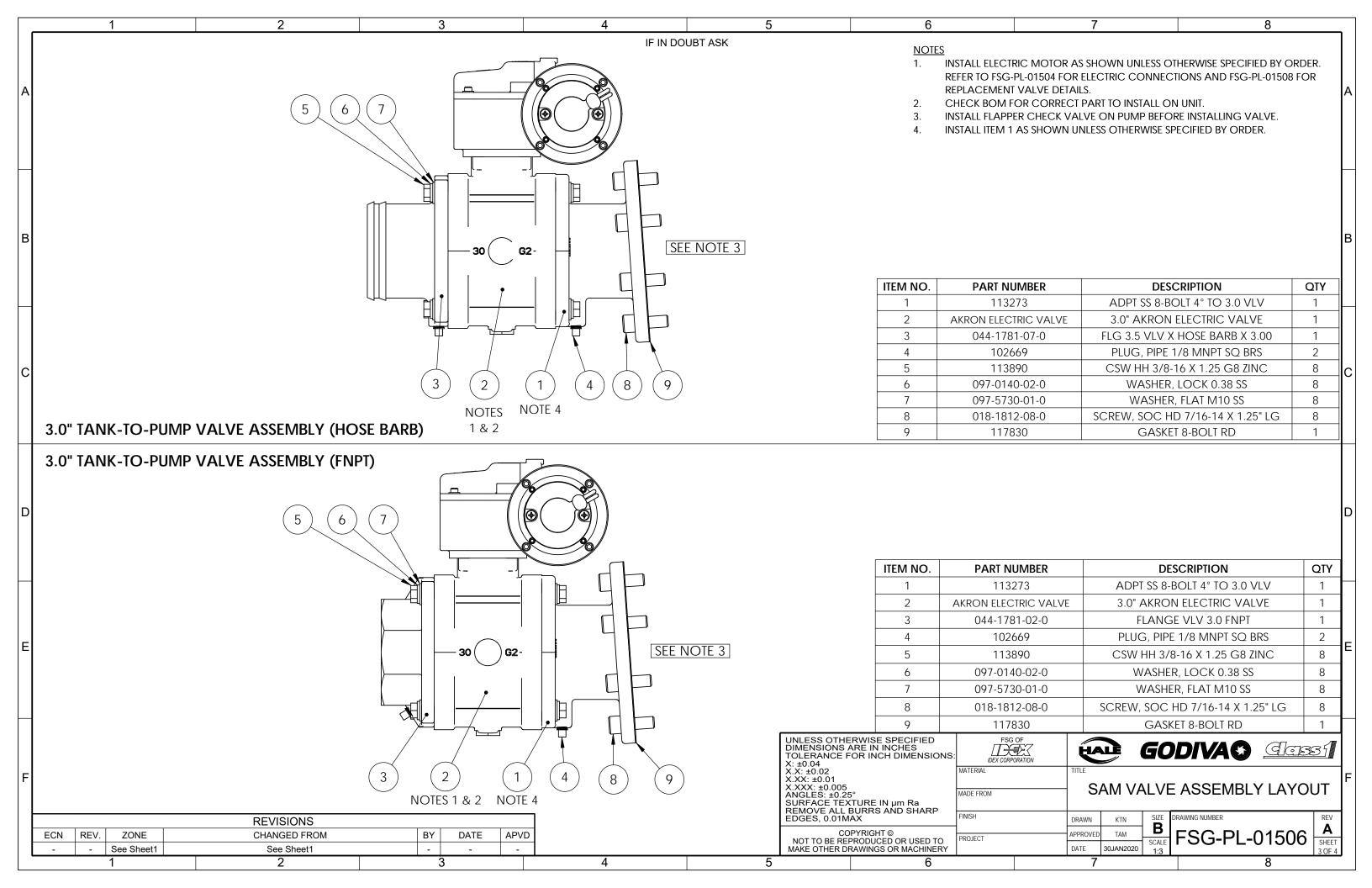


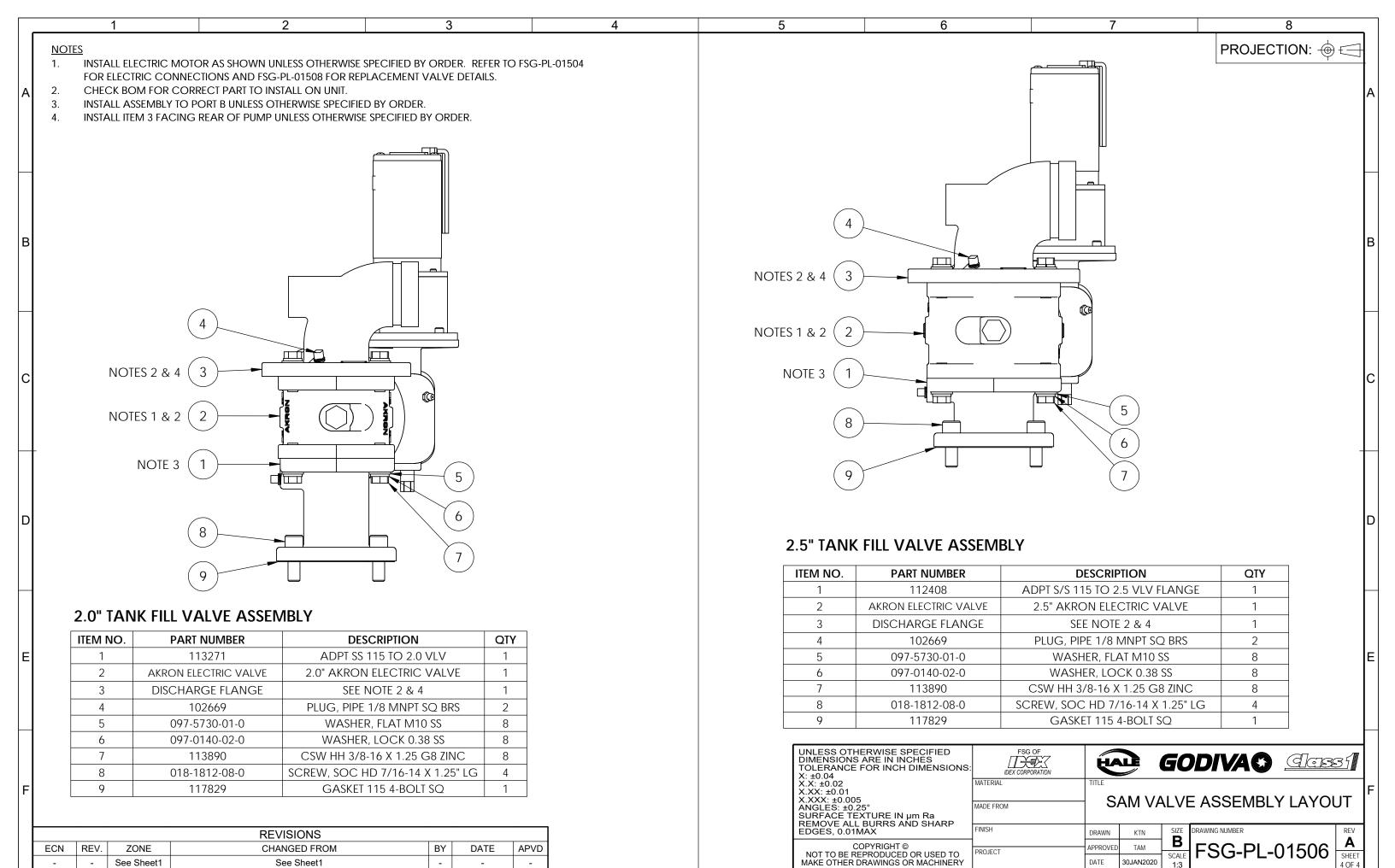


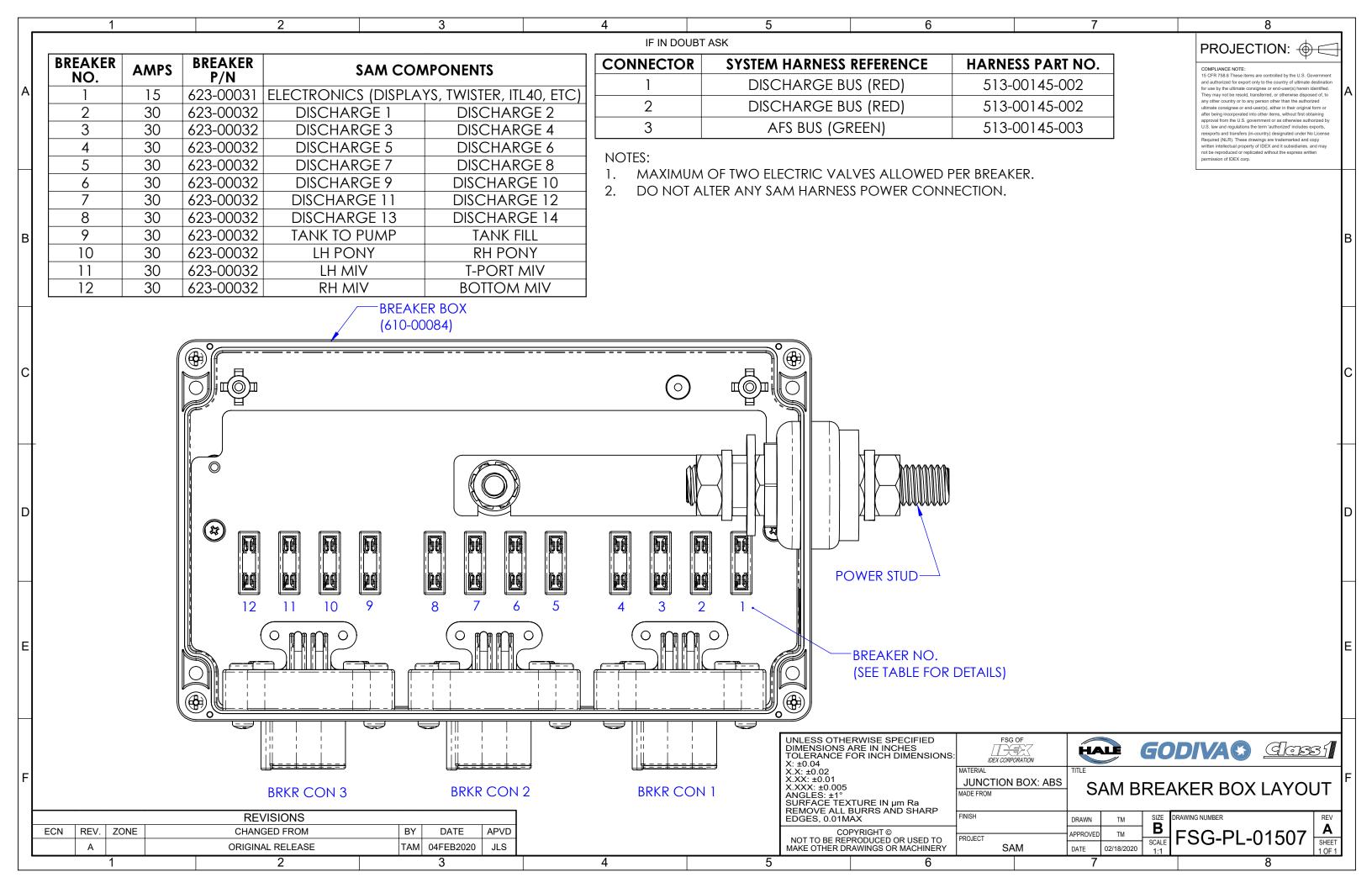
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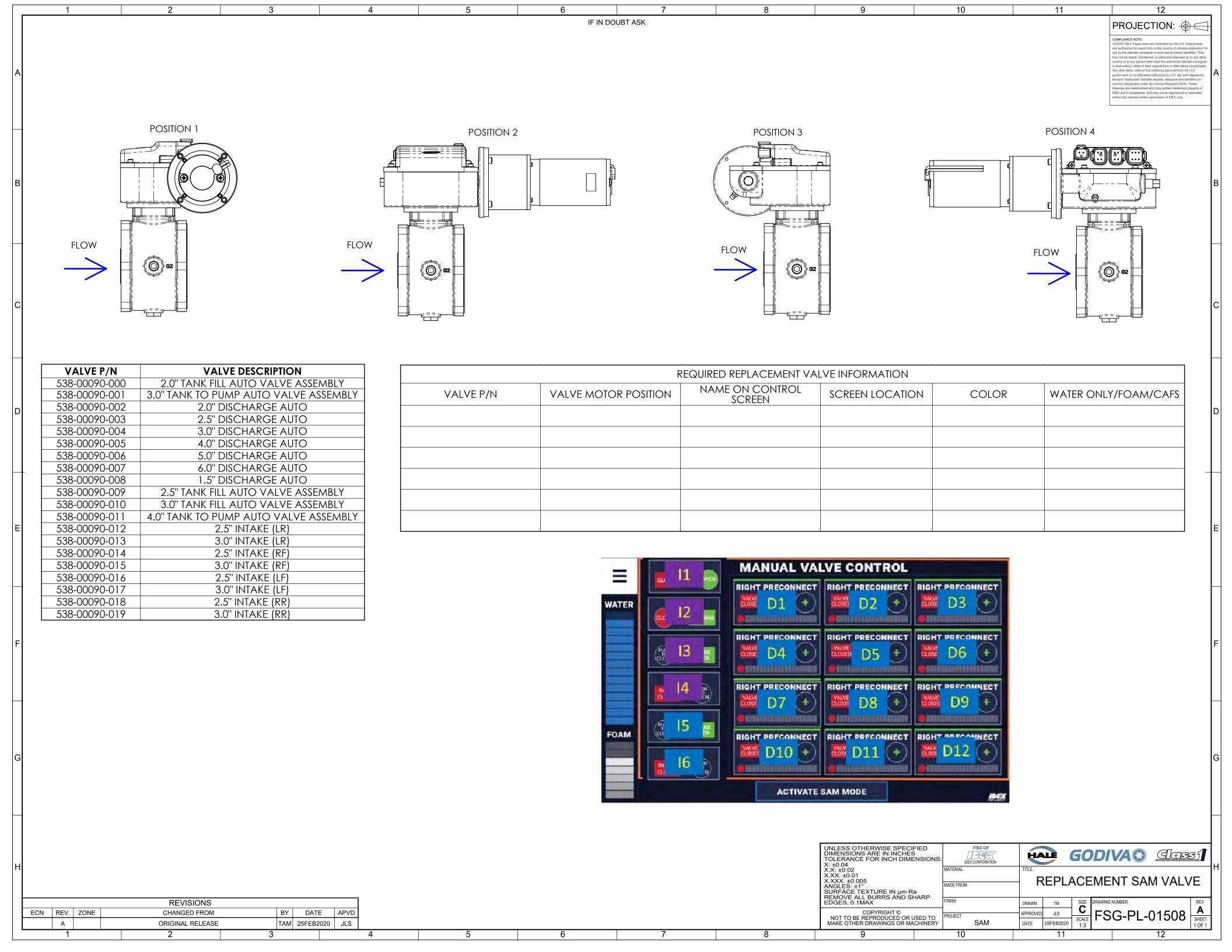




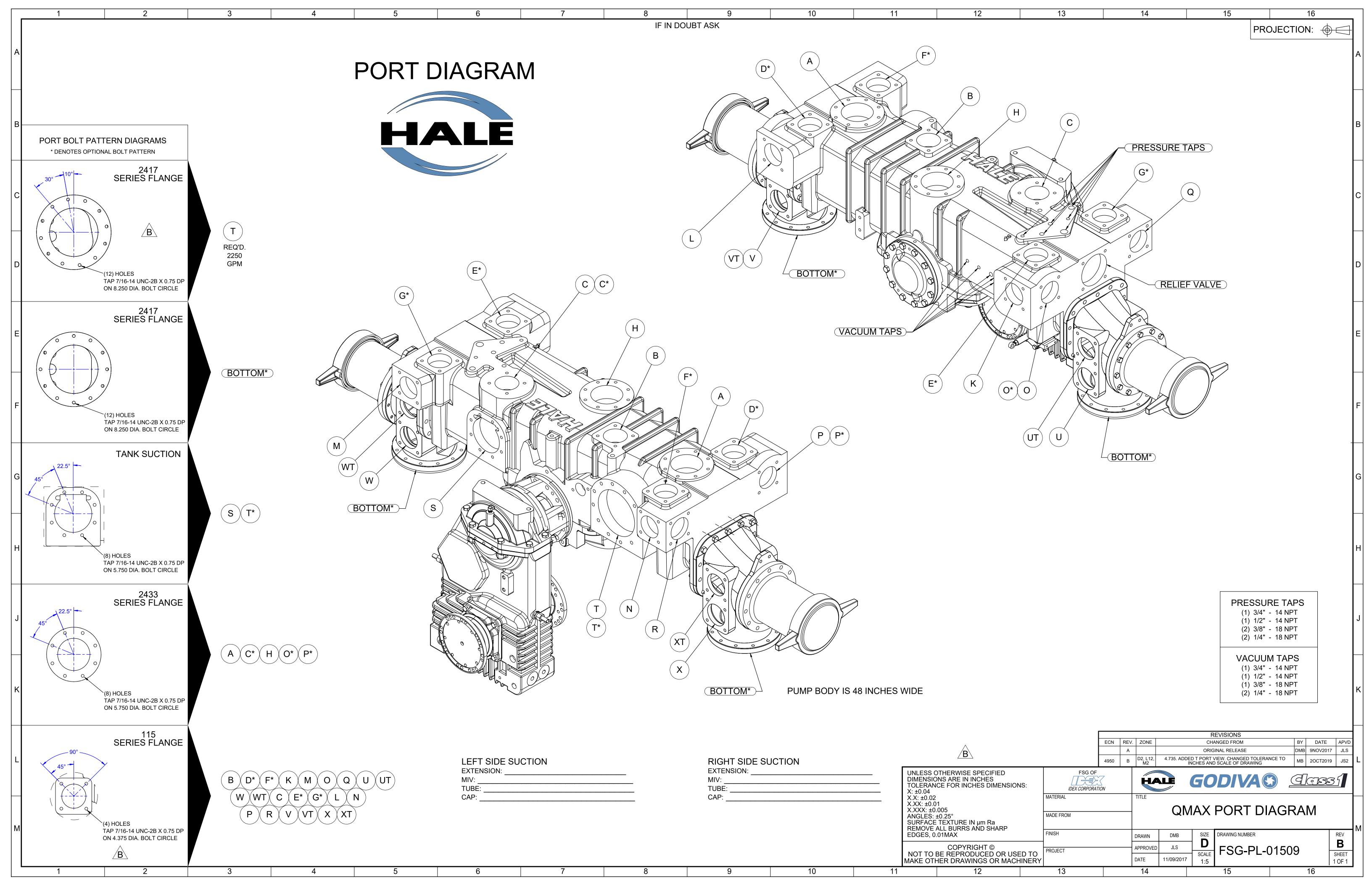




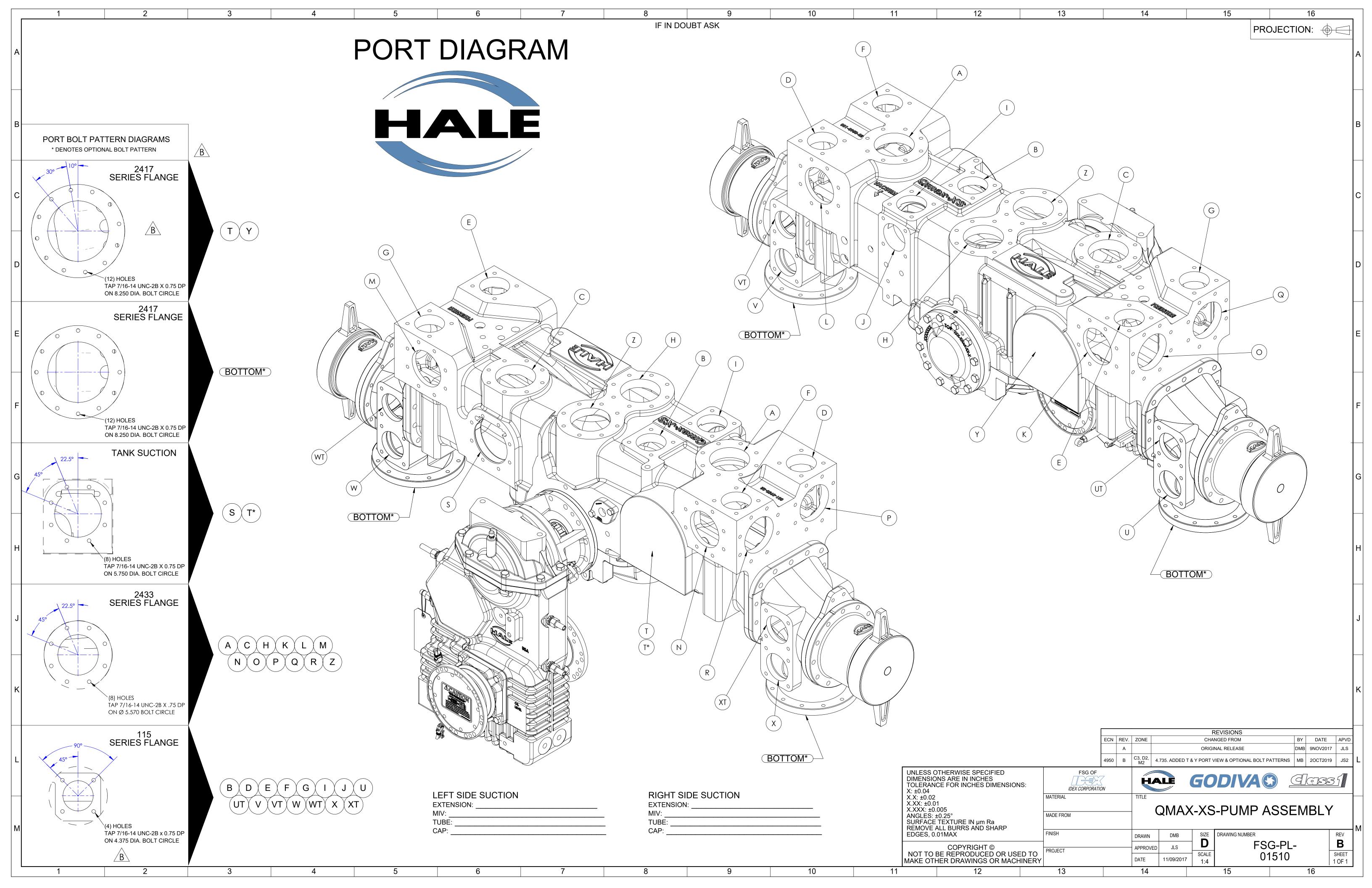
















APPENDIX A. MANUFACTURERS INFORMATION

This section provides a list that includes the name, address, and telephone number of the manufacturer's points of contact. Each provides the name address and telephone number of the manufacturer's representative and/or service organization that can provide replacements and is most convenient to the project sight.

A.1. Manufacturers Information

Additionally, included herein is warranty information.

MANUFACTURERS INFORMATION

Division	Address	Telephone
Class 1	Mailing: 607 NW 27th Ave, Ocala, FL 34475 Email: https://www.haleproducts.com	(800) 533-3569
Hale Products	Mailing: 607 NW 27th Ave, Ocala, FL 34475 Email: https://www.haleproducts.com	(800) 533-3569
Godiva LTD (A Unit of IDEX Corp.)	Mailing: Charles Street, Warwick, England, CV34 5LR Email: godiva@idexcorp.com	Tel: +44 (0) 1926 623600 FAX: +44 (0) 1926 623666

A.2. Warranty

See the Hale website (www.haleproducts.com) for product specific warranty and warranty procedures.