PCAir HOSE RETREIVER

Maintenance, Service and Parts Manual

BGSE Group
14034 Clarendon Point Court
Huntersville, NC 28078
United States of America

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CHAPTER 1 SAFETY INSTRUCTIONS AND WARNINGS

1 Essential Safety Rules

- WARNING
- ELECTRIC SHOCK CAN KILL. Do not touch energized (live) electrical parts.
- ELECTRIC ARC FLASH can injure the eyes, burn the skin, damage the equipment, damage and ignite combustible material.
- IMPROPER USE can damage the Hose Retriever itself and the equipment connected to it. Trained Operator Only should use care during operation

The BGSE Group PCAir HOSE RETRIEVER is designed and manufactured in compliance with the applicable state-of-the-art standards and safety rules. The retriever is equipped with all the safety, control and emergency stop devices required to grant the user with a high standard of safety protection.

NOTE: The word "user" identifies the company authorized to operate and to maintain the BGSE Group PCAir HOSE RETRIEVER. Should such company be the purchaser, the renter, the user on an extended loan or the operator of the BGSE Group PCAir HOSE RETRIEVER on any other account.

The owner has the duty, and the responsibility, of giving all applicable information and documentation to the worker acting as operator or to the maintenance technician operating on the BGSE Group PCAir HOSE RETRIEVER.

Nevertheless, the BGSE Group PCAir HOSE RETRIEVER, if operated by non-properly trained personnel, or if improperly operated, or else operated in a way not complying with the scope of work, can raise risks of hazards.

1.1 User Safety Rules

1.1.1 Basic requirements for operating the BGSE Group PCAir HOSE RETRIEVER

The user commits himself or herself to operate the system only under safe operating conditions. The equipment must be kept clean, properly maintained and repaired in compliance with applicable technical specifications. Any alteration which may compromise the safety of the equipment must immediately be corrected.

The user must respect the time intervals scheduled for tests and inspections. Check at regular intervals all the safety devices installed and with respect to the scheduled inspection intervals. The information relevant to inspection and maintenance procedures are included in the maintenance manual.

All the safety recommendations and the hazard warnings shown on the equipment, or on any component, must be kept clearly legible and must not be removed for any reason.

The user must provide the operator(s) with the required individual protective devices and supervise the proper use of the equipment. While making use of consumable and / or auxiliary materials such as grease, oils, hydraulic fluids and

cleaning fluids respect the rules in matters of health and safety precautions. The rules concerning the environmental safety, and the ones concerning the disposal of materials, must be observed.

1.1.2 Improvements and Alterations

The BGSE Group PCAir HOSE RETRIEVER cannot be altered, converted or improved. In the same way, the installation and the adjustment of safety devices and welding on electrically live components or equipment, is prohibited. If the user makes alterations or conversions of the BGSE Group PCAir HOSE RETRIEVER without B GSE Group, LLC's written consent, any responsibility or warranty assumed by. BGSE Group is to be considered null and void.

1.1.3 Spare Parts

Spare parts replaced on the unit must comply with the technical requirements outlined by the BGSE Group. Original factory spare parts always meet such requirements. The B GSE Group, LLC. will not be liable for damages caused using non-original spare parts.

1.2 Operators and Maintenance Technicians Safety Rules

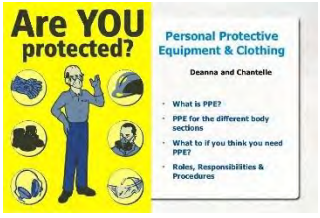
All the staff involved in mounting, installing, commissioning, operating, and / or maintaining the BGSE Group PCAir HOSE RETRIEVER must read and understand the "Operation & Maintenance Manual" before working on the unit. In particular, the below instructions,

Only those having successfully completed a proper training course can be authorized to operate, or to perform maintenance interventions on the BGSE Group Air HOSE RETRIEVER. Such condition is applicable to all the operations performed on electrical / mechanical components of the unit or its assemblies.

Maintenance technicians must have undergone proper training in order to be qualified to perform any maintenance intervention in their specific operating area (mechanical, electrical etc.). The essential knowledge of different task requirements must be such as to allow the independent performing of non-complex interventions (such as the connection/disconnection of electric motors made by mechanical service technicians).

Nobody should be authorized to work on the BGSE Group PCAir HOSE RETRIEVER if not properly trained or if still undergoing training, without the permanent supervision of a qualified operator. If several people are operating on one unit or assembly, clearly specify the individual responsibilities. For safety purposes, no doubt must be left about who is responsible of what, in view of executing specific tasks.

1.2.1 Individual Protective Devices



Working personnel must always wear clothes suitable for preventing possible accidents. No ties, rings, chains, should be worn which could be trapped by revolving components. Protect long hair by proper caps. In any case, always be aware and comply with applicable local regulations. It is recommended maintenance technicians servicing the B GSE Group PCAir HOSE RETRIEVER wear the following Individual Personal Protective Devices before attempting any maintenance or repair operation:

Eyes protection

Wear unbreakable protective eyeglasses with side protection during drilling, grinding, cutting operations. Swarth may cause major injuries to eyes. While sanding, wear protective eyeglasses and / or mask.

Gloves

Wear protective gloves against mechanical dangers (puncturing, cutting, vibrations etc.) when welding or manipulating raw edges. Pay maximum attention to situations in which the glove could be trapped inside the unit.

Wear protective gloves against dangers by chemicals. If employing aggressive chemical substances, wear rubber coated gloves. Protective gloves are also recommended when performing works involving other fluids such as oils for motors and transmission gears. Wear electrician protective gloves or thermal insulated gloves when required by the work to be performed.

Shoes

Always wear safety shoes with steel tip to protect big toes from injury due to the eventual fall of objects.

Safety helmet

Always wear a safety helmet while performing operations possibly involving head injury, while performing installation / removal works in overhead positions, or when a crane is operating in the working area.

Safety Vest REQUIRED

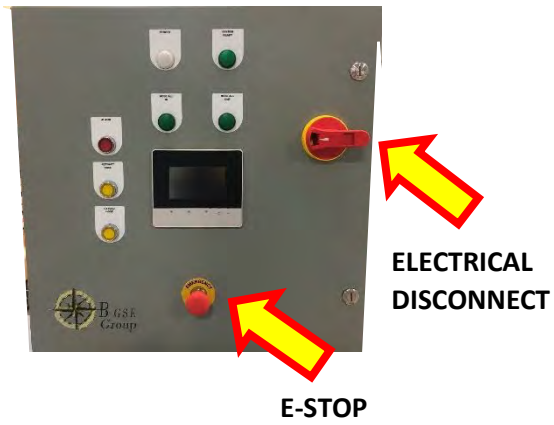
The possibility of aircraft and GSE movement demands that a safety vest be worn at all Times.

1.3 Guidelines for Operators and Maintenance Technicians

Operation and Maintenance Manuals must be fully read and understood before operating the BGSE Group PCAir HOSE RETRIEVER.

If any situation compromising the safety measures occurs or in case of functional defects, the PCAir HOSE RETRIEVER must immediately be disconnected and protected.

Report the fault to the qualified department or to the supervisor and make sure that proper measures are taken to correct the fault.



Do not follow working methods different from the ones prescribed herein or which may compromise the safety requirements.

Make sure the placards showing safety instructions and warnings applied on the BGSE Group PCAir HOSE RETRIEVER are complete and can be easily read.

Only the Electromechanical Service Department operators should be provided with the locking keys of mechanical doors / panels and electric boxes. The screwdriver actuated locks should not be opened except by trained and authorized personnel.

Be careful not to activate, accidentally or purposely, electric limit switches, motor drives or other components or actuators involved in the control process. In such case, risks of personal injury or damage to the equipment may occur.

Follow the recommended procedures before starting anew (restarting) the BGSE Group PCAir HOSE RETRIEVER

Operate the unit only when all the protective devices and the safety components, such as the access doors, locking mechanisms or the emergency stop pushbuttons, are in place and properly operating. Under no circumstance can protective devices be removed, disconnect, or altered. Any alteration of the safety devices implies the following risks:

- danger of death for the operator
- danger of damage to the unit.

Before attempting maintenance or repair operations, disconnect power supply from the units and take proper precautions in order to prevent the accidental, unintentional powering of the unit.

1.4 Shock Prevention

Bare wires or terminals in the output circuit, or ungrounded, electrically live equipment, can fatally shock a person. Have a certified electrician check that the equipment is adequately grounded and learn what terminals and parts are electrically energized.

Use proper safety clothing, procedures and test equipment.

The electrical resistance of the body is decreased when wet, allowing dangerous currents to flow through it. When inspecting or servicing the equipment, do not work in damp areas. Stand on a dry rubber mat or dry wood, use insulating gloves when dampness or sweat cannot be avoided.

Keep clothing dry and never work alone.

The following table lists the potential hazards to be taken into consideration while operating the preconditioned air Hose Retrievers and the safety precautions to be respected:

DANGER	POTENTIAL DANGER	PRECAUTIONS
Unit in “Hose Retrieval” or “Hose Extraction” mode.	Operating the hose retriever with the canopy Open.	Make sure the sliding canopy is closed before starting the unit.
Air Supply Hose	To operate the PCA unit while the air supply hose is not connected to the aircraft.	Securely connect the air supply hose op the aircraft before starting the PCAir Unit.
Maintenance Operations	To start the Hose Retriever during servicing.	Disconnect power before starting service to the retriever.

1.4.1 Safety precautions to be respected before starting the Hose Retriever

- Inspect the unit for external damages.
- Make sure the preventive maintenance has been performed.
- Make sure nobody stands in the operating area before starting the Hose Retriever

1.4.2 Safety precautions to be respected during the operation of the Hose Retriever

- Connect the air supply hose to the aircraft before starting the PCA unit.
- Do not climb upon the unit.
- Do not open the canopy while the unit is operating, nor attempt to start the unit with the canopy open. Wait till the PCA unit has come to a complete stop before disconnecting the air supply hose from the aircraft.

1.4.3 Safety precautions to be respected during the inspection and the maintenance of the unit

The Hose Retriever must be kept in good electrical and mechanical conditions to prevent damages caused by wear. Always report any eventual fault or safety hazard to the supervisor and discontinue the use of the equipment until its safety requirements have been assured. Repairs should be made by qualified and authorized personnel only.

Before inspecting or servicing electrically powered equipment, take the following precautions

- Shut off all power to the main switch.
- Lock the main switch open so that power cannot be turned on accidentally.
- Disconnect power to the equipment if it is out of service.
- If troubleshooting must be performed with the unit energized, have another person present who is trained in turning off the equipment and providing or calling for first aid.

1.5 Fire and explosion prevention

Fire and explosion can be caused by electrical short circuits. Overloaded or short-circuited equipment can become hot enough to cause fires either by self-destruction or by contact with nearby combustibles.

1.6 First aid treatment

An Emergency Rescue Squad must be available to immediately assist the operator(s) in the case of injury. Electric shock victims should be checked by a physician, and taken to a hospital immediately, if any abnormal signs are observed.

First aid in emergency condition

In case of electric shock, turn power off immediately. Call for a physician. Seek additional assistance and apply the First Aid techniques recommended by the Red Cross until medical help arrives.

If breathing is difficult, give oxygen, if available, and have the victim lie down. If the victim is not breathing, begin artificial respiration, preferably mouth-to-mouth. If pulse is not detectable, begin external heart massage. Coll for the Emergency Rescue Squad immediately.

CHAPTER 2 DESCRIPTION & MAIN COMPONENTS

The B GSE Group Hose4 Retriever is designed for extending and retrieving the pre-conditioned air spiral hose necessary to make the connection with the aircraft to be air-conditioned.

Only the length necessary to connect to the aircraft will be deployed, while the hose stored inside the rigid storage tube undergoes no deformation preventing any pressure or airflow reduction.

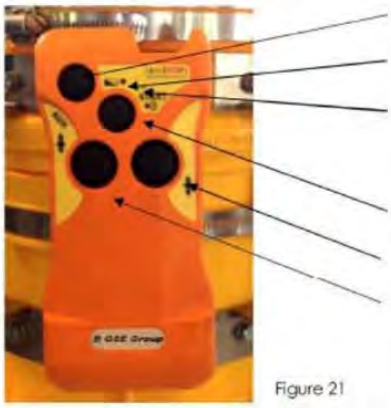


Figure 21

Push-Button
Red LED

"On Green LED"

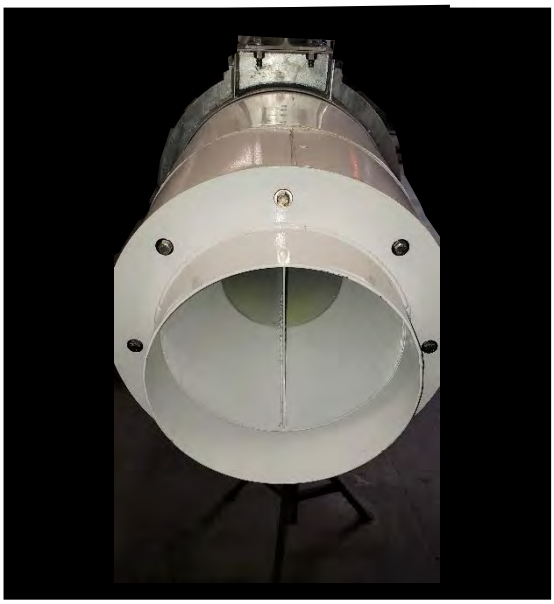
"Start" pushbutton "S"

"HOSE EXTENSION" pushbutton

"HOSE RETREIVAL" pushbutton

2.1 Inlet Flange

Manufactured in steel and powder coated, the inlet flange is fixed at the retriever inlet by means of bolts and nuts. Inlet outer diameter 14 Inches (355 mm)



2.2 Control Box

Control Box

QUEEN CITY SUPPLY
1859 SECTION RD. CINCINNATI, OH 45237
VOLTS: 480 PLASE:3 AMPS:5
FREQUENCY: 60 HZ LARGEST MOTOR SIZE: 10
ENCLOSURE TYPE: 12
WIRING DIAGRAM: 2017409
SHORT CIRCUIT CURRENT RATING:
10ka RMS symmetrical
MODEL #SHR-480-NO-UL
SERIAL# 19120001

2.3 Control Panel Parts List

The stainless-steel control box houses the main electrical components of the Hose Retriever. It is positioned on the side of the equipment and fixed onto it by means of a metal bracket. It grants NEMA-4 (IP65) protection. The control box is provided with three quick-disconnect connectors for fast removal and installation.

BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION
1	1	LOVATO	GA063A	MAIN DISCONNECT	31	53	WAGO	2002-1201	GREY TERMINAL BLOCK	61	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 15"
2	1	LOVATO	GAX66N	DISCONNECT HANDLE	32	5	WAGO	2002-1291	END BARRIER	62	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 15"
3	1	LOVATO	GAX7300AN	DISCONNECT SHAFT	33	14	WAGO	249-116	END CLAMP	63	1	MONOPRICE	9871	7' ETHERNET CABLE BLUE
4	1	LOVATO	GAX60B	ADAPTER FOR PISTOL GRIP	34	10	WAGO	2002-1207	GROUND TERMINAL BLOCK	64	1	MQ-CUSTOM	MQ-CAN121901	DB9-RJ45 CANopen CABLE
5	1	SPRECHER & SCHUH	L9-2/2/C	CIRCUIT BREAKER	35	2	WAGO	2002-405	5 POSITION JUMPER	65				
6	1	WAGO	787-1628	POWER SUPPLY	36	1	WAGO	2002-403	3 POSITION JUMPER	66				
7	1	SPRECHER & SCHUH	D7P-P7PN3W	AMBER PILOT LIGHT	37	6	IGUS	I-BVND-M207GT	21.2MM OD CONNECTOR M20	67				
8	1	SPRECHER & SCHUH	KTU7-D-3D-10	MOTOR DISCONNECT	38	140	IGUS	I-CYLT-17B	PMA PLASTIC CONDUIT	68				
9	1	BARDAC	P2-24020-3HF42	VFD 2 HP WITH STO	39	2	MENCOM	2M20PA/SW	M20 PLASTIC NUT	69				
10	4	SPRECHER & SCHUH	KTA7-25S-1.6A	MOTOR OVERLOAD	40	3	SAGINAW ELEC	SCE-ASPBG-SS	.875 SS HOLE FILLER	70				
11	1	SPRECHER & SCHUH	KT7-32-DB-45-4	OVERLOAD BUSBAR	41	1	MENCOM	PCG-11-B	PG11 CORD GRIP & NUT	71				
12	1	SPRECHER & SCHUH	D7P-MT44PX02	E-STOP TWIST TO RELEASE	42	4	MENCOM	316G	PG16 "O" RING	72				
13	1	WAGO	762-4301/8000-002	4.3" WEB PANEL	43	1	EXM	5412ESSP242410	24x24x10 SS ENCLOSURE	73				
14	1	WAGO	750-602	POWER FEED MODULE	44	1	EXM	881 SP2424	24x24 SUB PANEL	74				
15	1	WAGO	750-362	MODBUS BUS COUPLER	45	1	EXM	880-BD1	ENCLOSURE DRAIN	75				
16	1	WAGO	750-600	END MODULE	46	1	MENCOM	PCG-16R-B	PG16 CORD GRIP & NUT	76				
17	1	REMDEVICE	T3-ECO-915	REMOTE CONTROLRECEIVER	47	1	BELDEN	8465	4 FEET OF 8465 CABLE	77				
18	1	WAGO	750-1406	16PT INPUT MODULE	48	1	WAGO	210-112	35MM DIN RAIL 8-1/2"	78				
19	1	SPRECHER & SCHUH	D7P-LF4PN3RX10	RED LIGHTED PB	49	1	WAGO	210-112	35MM DIN RAIL 9-1/4"	79				
20	2	SPRECHER & SCHUH	D7P-LF5PN3WX10	YELLOW LIGHTED PB	50	1	WAGO	210-112	35MM DIN RAIL 4-3/4"	80				
21					51	1	WAGO	210-112	35MM DIN RAIL 3-1/2"	81				
22	1	SPRECHER & SCHUH	KT7-PE1-10	MOTOR OL AUX CONTACT	52	1	WAGO	210-112	35MM DIN RAIL 15-5/8"	82				
23	1	WAGO	750-530	8PT OUTPUT CARD	53	1	PANDUIT	F1X3LG6	1"x3" WIRE DUCT 20-3/4"	83				
24	3	SPRECHER & SCHUH	D7P-P3PN3G	GREEN PILOT LIGHT	54	1	PANDUIT	C1LG6	1" DUCT COVER 20-3/4"	84				
25					55	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 9-1/4"	85				
26	1	WAGO	750-515	4PT RELAY OUTPUT CARD	56	1	PANDUIT	C1.5LG6	1" DUCT COVER 9-1/4"	86				
27	1	ILME	MHO-10.21	10 PIN CONNECTOR HOOD	57	1	PANDUIT	F1X3LG6	1"x3" WIRE DUCT 15"	87				
28	1	ILME	CNEF-10T	10 PIN FEMALE CONNECTOR	58	1	PANDUIT	C1LG6	1" DUCT COVER 15"	88				
29	1	ILME	CHP-10	10 PIN DOUBLE LATCH BASE	59	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 5-1/8"	89				
30	1	ILME	CNEM-10T	10 PIN MALE CONNECTOR	60	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 5-1/8"	90				

REVISION
2 16DEC2019 UPDATED PER ABOVE CHANGES
1 08NOV2019 ISSUED FOR FABRICATION

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BOM
SHEET 14 OF 14

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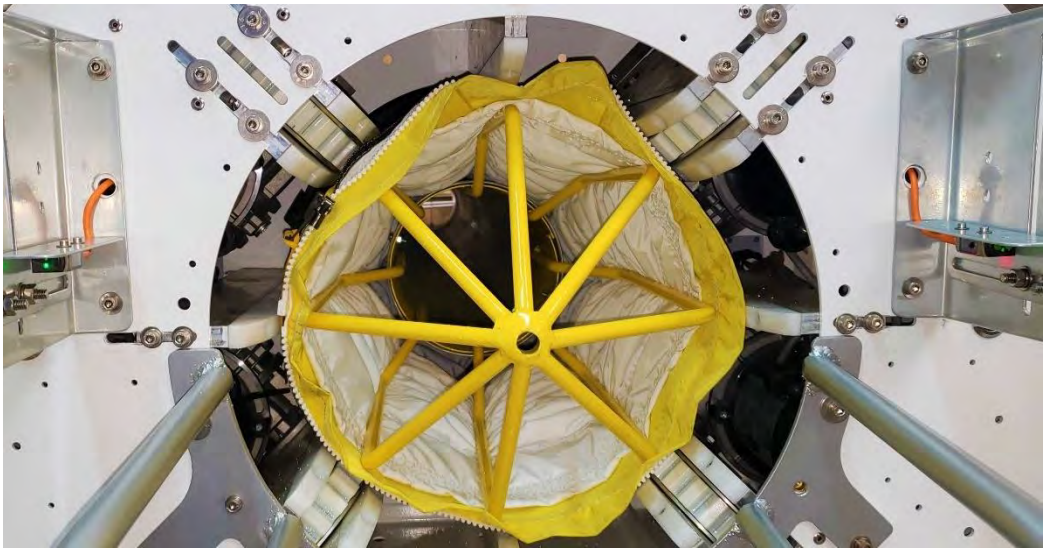
DRAWN BY: TIM RHOAD
DATE: 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER: 2017409
DRAWING NUMBER: WD14 -1

2.4 Hose Extracting Head

At the outlet of the BGSE Hose Retriever, one finds an extracting / deploying head guide. The BGSE Group, PCAir Hose Retriever can accommodate spiral hoses of different dimensions and designs. Each belt assembly can be adjusted individually and independently from the other three. Numbered dents on the internal surface of the front side ease the centering of the spiral hose inside the extraction head. The centering of the hose contained in the BGSE Group Hose Retriever has been factory adjusted. Before commissioning, it is anyway recommended to check the actual centering of the spiral hose. For adjusting instructions, please see chapter 6.

Adjustment of Head Alignment for proper contact with hose for extension and retraction.

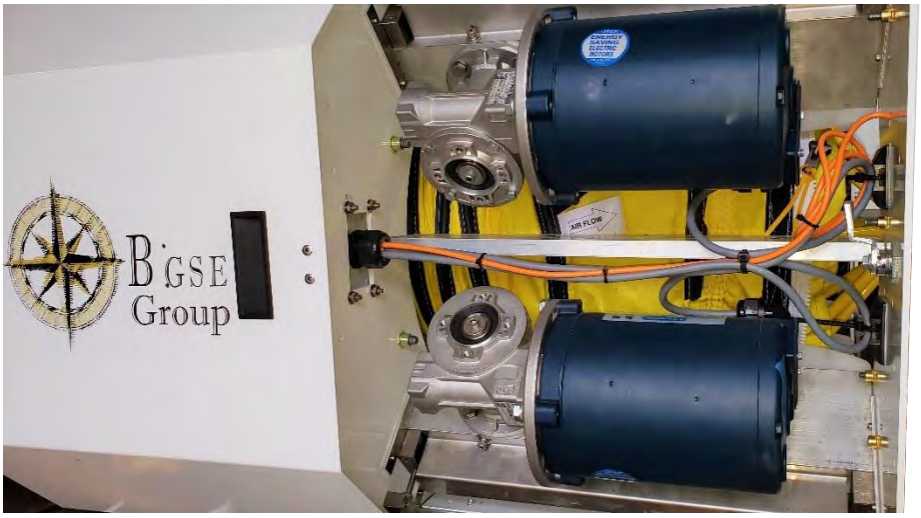
Retractor Mechanism



Hose

2.5 Gear Motors

The four gear motors driving the transmission belts are positioned inside the retriever head. They are equally spaced along the perimeter of the flexible hose they are in contact with. They provide power for the extraction and the retraction of the flexible hose out and in the hose retriever.



2.6 Aluminum Hose Storing Tube

The rear portion of the Hose Retriever is a 6060 TS Aluminum alloy tube housing the spiral hose. Its length depends on the total length of the hose to be contained.

2.7 Air Supply Hose

2.7.1 Metal Spiral Hose

SPIRAL INSULATED HOSE
B GSE Group PCAir Hose Retriever

DESCRIPTION

The hose is manufactured with Valmex fabric made by 3 mm insulating foam coated by PVC layer on outer surface.
The hose is manufactured in helicoidal fabric band joined by a special steel wire and band joining together the fabric band.
The steel spire is not covered by PVC stripe and have a pitch of 12 cm and diameter of 5 mm.
The enclosed picture shows the hose.
The standard length is 7 m, joined by zip and Velcro.
The hose ends with a reduction 14" to 8" to connect the aircraft adaptor.

Advantages:
- reduced weight
- reduced friction on apron surface of the steel compared to PVC stripe
- increased compression ratio in the retriever by the absence of the black PVC stripe
- mechanical crimping of the hose fabric without any welding process.

The result is max extended life of the hose and easier manoeuvrability.

TECHNICAL SPECIFICATIONS

Diameter:	14", 360 cm
Fabric:	Valmex foam PVC coated 3 mm thickness
Weight:	1.3 kg/m
Breaking resistance:	2700 N / 5 cm (ISO 1421/1)
Tearing resistance:	280 N (DIN 53363)
Thermal coefficient K:	3.7 W/m2k
Operating temperature:	-20/+70°C
UV Resistance:	> 6 (ISO 877)
Inflammability:	DIN 4102B1
Service pressure:	up to 12.000 Pa
Test pressure:	20,000 Pa

P/N: BGSE SSHR Hose. SSHR020: 20 Foot Length, SSHR100 Foot Length, SSHR Tapered End 14" – 8"

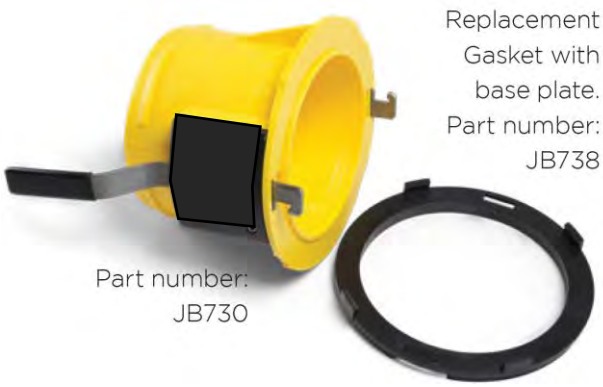
2.7.2 Flat Hose

The insulated Flat Duct is an extremely flexible heating and air-conditioning duct specifically designed for the BGSE CoolJet® Hose Retriever.

It is constructed without wire reinforcement, allowing it to be flattened in case of runover. The Flat Duct hose is constructed of two-ply, flexible, heavy duty and highly abrasion resistant vinyl coated fabric with moisture proof insulation between the plies and rip stop nylon liner. Features of Specialized BGSE CoolJet® Flat Duct: • Abrasion resistant scuff strip • Zipper/Velcro connections allow for longer duct assemblies • Available with inside diameters of 14" • Tolerant to temperature variations of -40° F to + 275° F • Minimum R-value of 8.0 or greater

2.8 Air Supply Adapter and Radio Control System

The aircraft adaptor is of rugged construction and design. It is UV resistant and designed to withstand chemicals, fuels and solvents generally found in the harsh ramp environment. It has a “Snap-On” gasket eliminating the need for glues.



The swiveling system prevents twists, kinks and alignment issues at the hose outlet and allows the maximum airflow to the aircraft.

The 8" male adaptor, manufactured in high durability nylon, is equipped with integral handles to ease the operation; the body for the latching mechanism is molded into the connector itself The adaptor is further equipped with two stainless steel handles granting easy handling and protecting the radio control sender against accidental damage.

The sender finds its place inside the push-button station on the aircraft adaptor. It is equipped with hose extraction and retraction controls. At the time of setup / commissioning, a single transmission channel is established between sender and receiver. This makes the operation safe and allows for two or more retrievers to be operated simultaneously. The radio-control operates on the 870 MHz free usage frequency and complies with the following US and European regulations:

ERC Recommendation n° 70-03 relating to the use of Short-Range Device (SRD) The receiver, positioned on the side of the control box, includes a pair of receiving antennas. The sender is powered by a long-life battery. It is non-rechargeable (please see Chapter 6 for specifications and Chapter 7 for details).

XL-205F-Cap

NOTE: Remote Control Battery is lithium and **CANNOT** be shipped via Airfreight. It is **RECOMMENDED** stocking this item at location!

2.9 Safety Devices

The safety devices installed on the Hose Retriever are:

- Proximity switch "Hose All Out" (1)
- Photocell limit switch "Hose All In" (2)
- PCA unit interlock"
- "PBB Interlock"
- Adjustable overload on VFD

The BGSE PCAir Hose Retriever is equipped with a "maintenance mode" feature on the HMI. If operated, it by-passes both the "Hose all out" and the "Hose all in" limit switches. Please see details of HMI (Human Machine Interface), section 6.4 / page

CHAPTER 3 TECHNICAL SPECIFICATIONS

3.1 Identifying Plate, CE and UL Compliance

QUEEN CITY SUPPLY
1859 SECTION RD. CINCINNATI, OH 45237
VOLTS: 480 PLASE:3 AMPS:5
FREQUENCY: 60 HZ LARGEST MOTOR SIZE: 10
ENCLOSURE TYPE: 12
WIRING DIAGRAM: 2017409
SHORT CIRCUIT CURRENT RATING:
10ka RMS symmetrical
MODEL #SHR-480-NO-UL
SERIAL# 19120001

What Is the Difference Between ETL and UL?

UL, Underwriters Laboratories, is an American safety certification company. They're headquartered in Northbrook, Illinois, and provide certification, testing, inspection and training services.

Both ETL and UL function as Nationally Recognized Testing Laboratories, or NRTLs. An NRTL is an independent, non-government laboratory recognized by the Occupational Health and Safety Administration (OSHA) as suitable to test products to applicable safety standards.

The NRTL program functions as part of OSHA's Directorate of Technical Support, which ensures that products are safe to use in the U.S. workplace. The NRTL program is designed to recognize the capabilities of private organizations to determine if their tests meet OSHA safety standards.

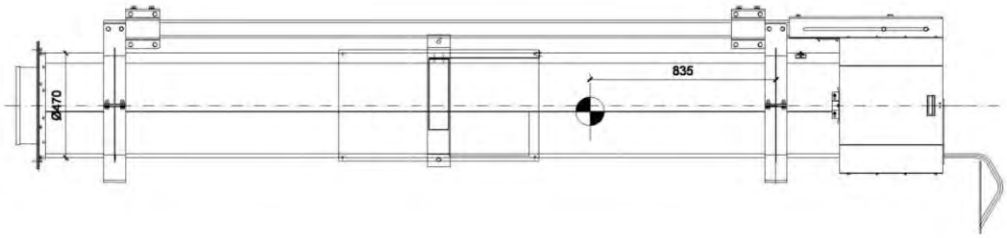
Both the ETL and UL marks demonstrate to clients, consumers and retailers that their product meets the bearing requirements for safety standards in their specific product.

Since both UL and ETL test to the same OSHA standards, there is no difference between ETL and UL — except for the marks they leave after testing.

3.2 Technical Specifications

- Power supply: 3 x 480V + 60Hz 6A (other options available)
- Control panel: IP 65 in AISI 304 stainless steel
- PLC Schneider control with display on the front door of the panel
- Tension Motors powered by inverter
- Limit switch for "full extension" and "all re-section"
- Dock movement interlock
- PCA ON interlock
- Extension / retraction speed: Variable up to a maximum of 25 m / min
- Maximum pressure drop with flow rate 150 Kg / min: 1,200 Pa
- Temperature loss with full extension pipe: 2 ° C at 35 ° C 50% UR
- Safety interlock on the panel door
- Protection against overload (inverter)
- REM Device T3 radio control system with control panel on the aircraft adapter (other options available)
- Ion battery of lithium, minimum operating life 1000 h
- Sound and light movement alert (option)
- Operating temperature: from -20 to + 60 ° C
- Noise below 60 dbA Reference standard:
- Machinery Directive 2006/42 / EC Low Directive Voltage 2006/95 / EC Electromagnetic compatibility Electromagnetic Directive 2004/108 / EC Radio and Telecommunications Directive 99/5 / EC Air delivery hose:
- Intertek Field Labelling, Limited Product Certifications
- Double layer of 1100 dtex polyester coated PVC, yellow color, 2 mm (5 mm optional)) of internal insulation plus air gap, reinforcement spiral in galvanized steel with a pitch of 5 mm
- Tensile strength: 2700 N / 5cm (ISO 142/1)
- Thermal conductivity: 0.06 W / m ° K (with 2 mm insulation)
- Fire retardant characteristics: M2 / B1 / BS / B-s2-d0 / NFPA 70
- Working pressure: 48 Inch WG 12,000 Pa
- Test pressure: 80 Inch WG (20,000 Pa)
- Aircraft adapter: 360 ° rotation system or equivalent

- Dimensions and weight: With 100 ft of hose
- H 39 ½ Inches (1016 mm)
- Width 35 ½ Inch (910 mm)
- Length 158 ½ Inch(4059 mm)
- 1,000 Lbs. (454 Kg) with 91 Ft (28 m) hose



CHAPTER 4 STORAGE AND HANDLING

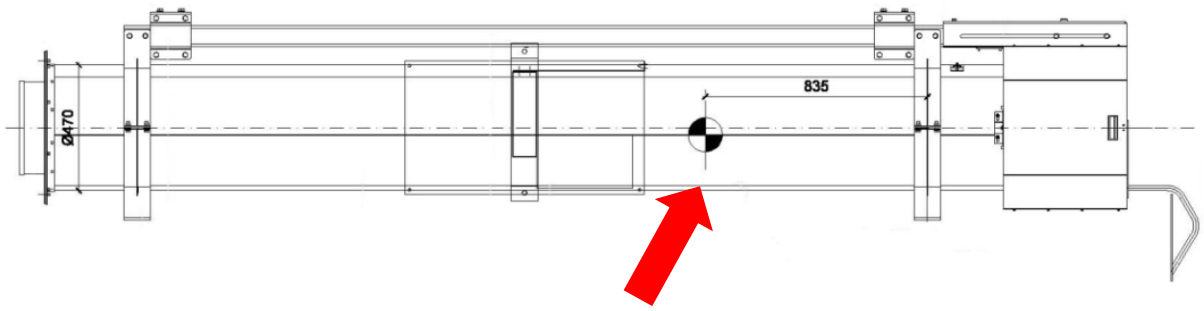
4.1 Storage

The B GSE Group Hole Retriever, when not in use, must be stored in a closed. dry, arid aerated place, protected, against flames, vapors or other inflammable fluids. moisture, and corrosive chemical substances.

The unit must be stored on a suitable stand for storage purposes. If the unit is stored prior to the installation, it is recommended not to remove the shipping and packing material in order to protect the integrity of the Hose Retriever. In the case long term storage is required, appropriate greasing of all mechanisms is mandatory.

4.2 Handling

- Dimensions and weight: With 100 ft of hose
- Height 39 ½ Inches (1016 mm)
- Width 35 ½ Inch (910 mm)
- Length 158 ½ Inch (4059 mm)
- Weight 1,000 Lbs. (454 Kg) with 91 Ft (28 m) hose



The hose retriever be handled by a crane, forklift or manpower after securing it by means of heavy-duty ropes.

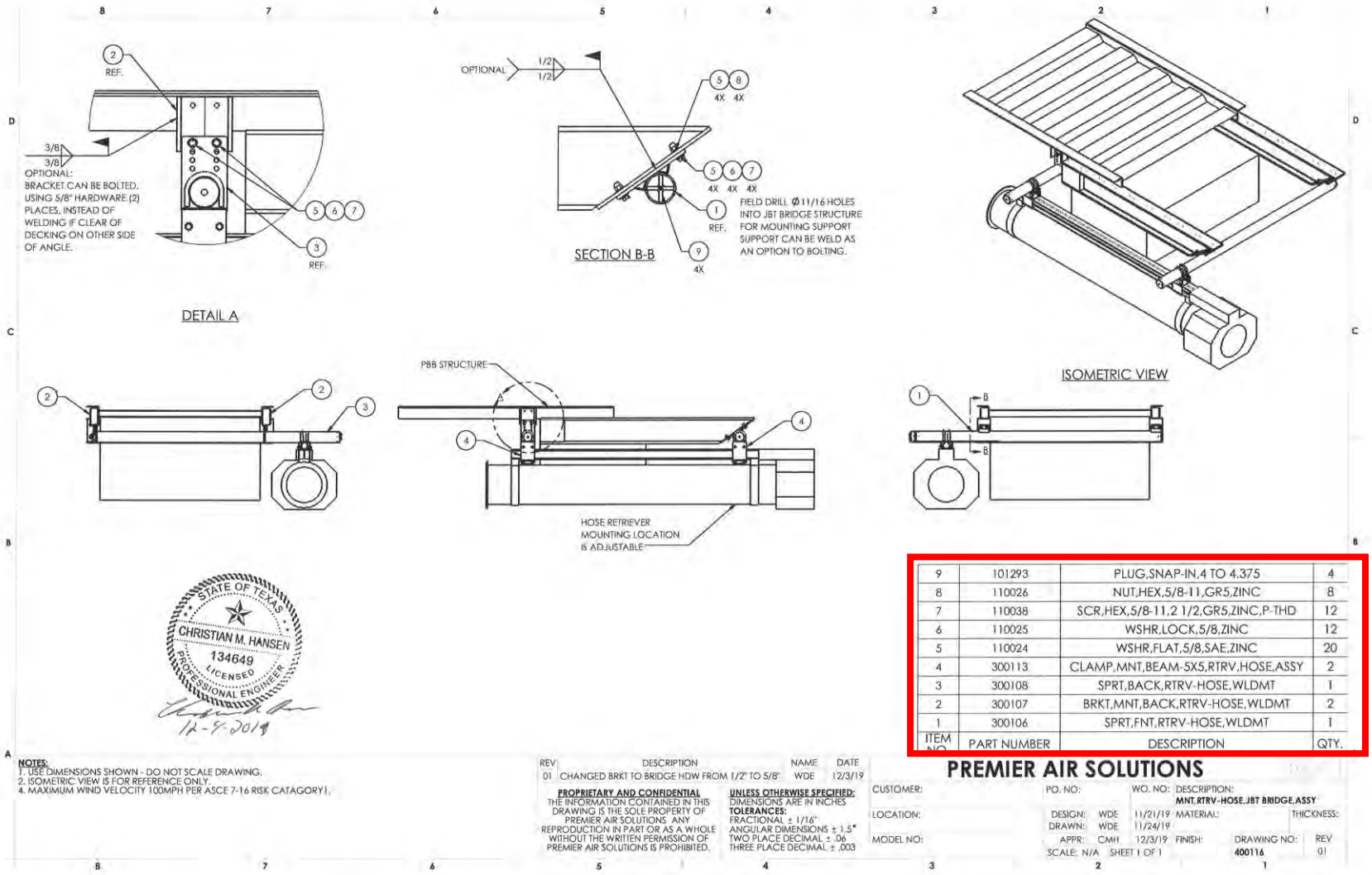
NOTE: The forks of the forklift must be adjusted at the minimum distance- of one meter. The Hose Retriever must be protected against accidental crashes by proper external protective means.

4.3 Installation

4.3.1 Installation of Mounting Support Under the Passenger Boarding Bridge

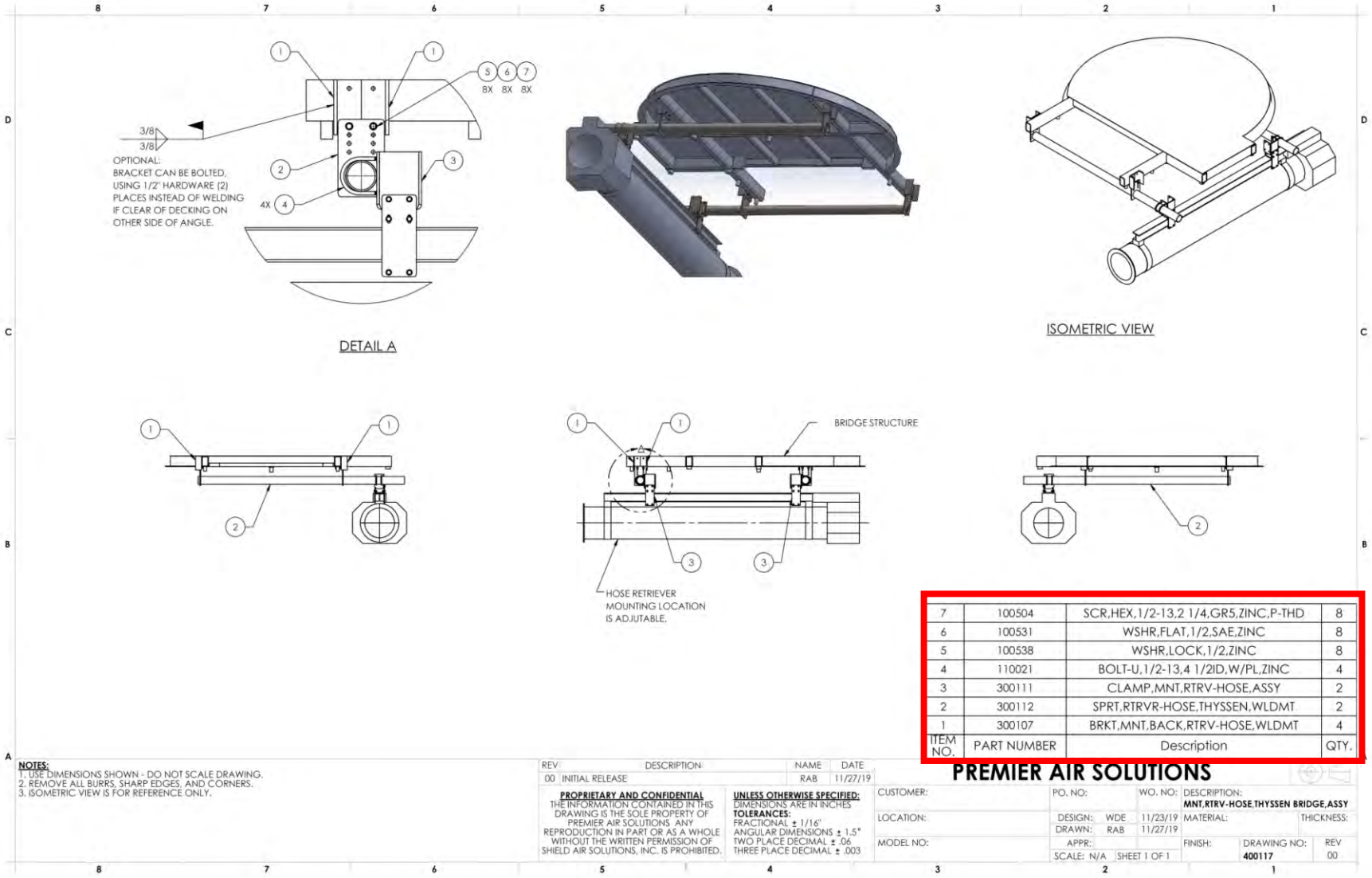
- Install the appropriate bracket as per the following details.
- Place the hose retriever in position under the passenger boarding bridge (by means of a crane or a forklift).
- First lighten the four vertical screws of each of the two supports - torque value 80 -90 Nm. Make sure the four horizontal bolts are loose while you tighten the vertical screws.
- Then tighten the four horizontal bolts of each of the two supports and fix them by self-locking nuts - torque value 40-50 Nm.
- This ensures the upper face of the support is fixed in plain position and the screws are subject to no bending load.

4.3.1.1 JBT Aerotech / Jetway®



ITEM NO	PART NUMBER	DESCRIPTION	QTY.
9	101293	PLUG,SNAP-IN,4 TO 4.375	4
8	110026	NUT,HEX,5/8-11,GR5,ZINC	8
7	110038	SCR,HEX,5/8-11,2 1/2,GR5,ZINC,P-THD	12
6	110025	WSHR,LOCK,5/8,ZINC	12
5	110024	WSHR,FLAT,5/8,SAE,ZINC	20
4	300113	CLAMP,MNT,BEAM-5X5,RTRV,HOSE,ASSY	2
3	300108	SPRT,BACK,RTRV-HOSE,WLDMT	1
2	300107	BRKT,MNT,BACK,RTRV-HOSE,WLDMT	2
1	300106	SPRT,FNT,RTRV-HOSE,WLDMT	1

4.3.1.2 Thyssen Krupp



ITEM NO.	PART NUMBER	Description	QTY.
7	100504	SCR,HEX,1/2-13,2 1/4,GR5,ZINC,P-THD	8
6	100531	WSHR,FLAT,1/2,SAE,ZINC	8
5	100538	WSHR,LOCK,1/2,ZINC	8
4	110021	BOLT-U,1/2-13,4 1/2ID,W/PL,ZINC	4
3	300111	CLAMP,MNT,RTRV-HOSE,ASSY	2
2	300112	SPRT,RTRVR-HOSE,THYSSEN,WLDMT	2
1	300107	BRKT,MNT,BACK,RTRV-HOSE,WLDMT	4

NOTES:
1. USE DIMENSIONS SHOWN - DO NOT SCALE DRAWING.
2. REMOVE ALL BURRS, SHARP EDGES, AND CORNERS.
3. ISOMETRIC VIEW IS FOR REFERENCE ONLY.

REV	DESCRIPTION	NAME	DATE
00	INITIAL RELEASE	RAB	11/27/19

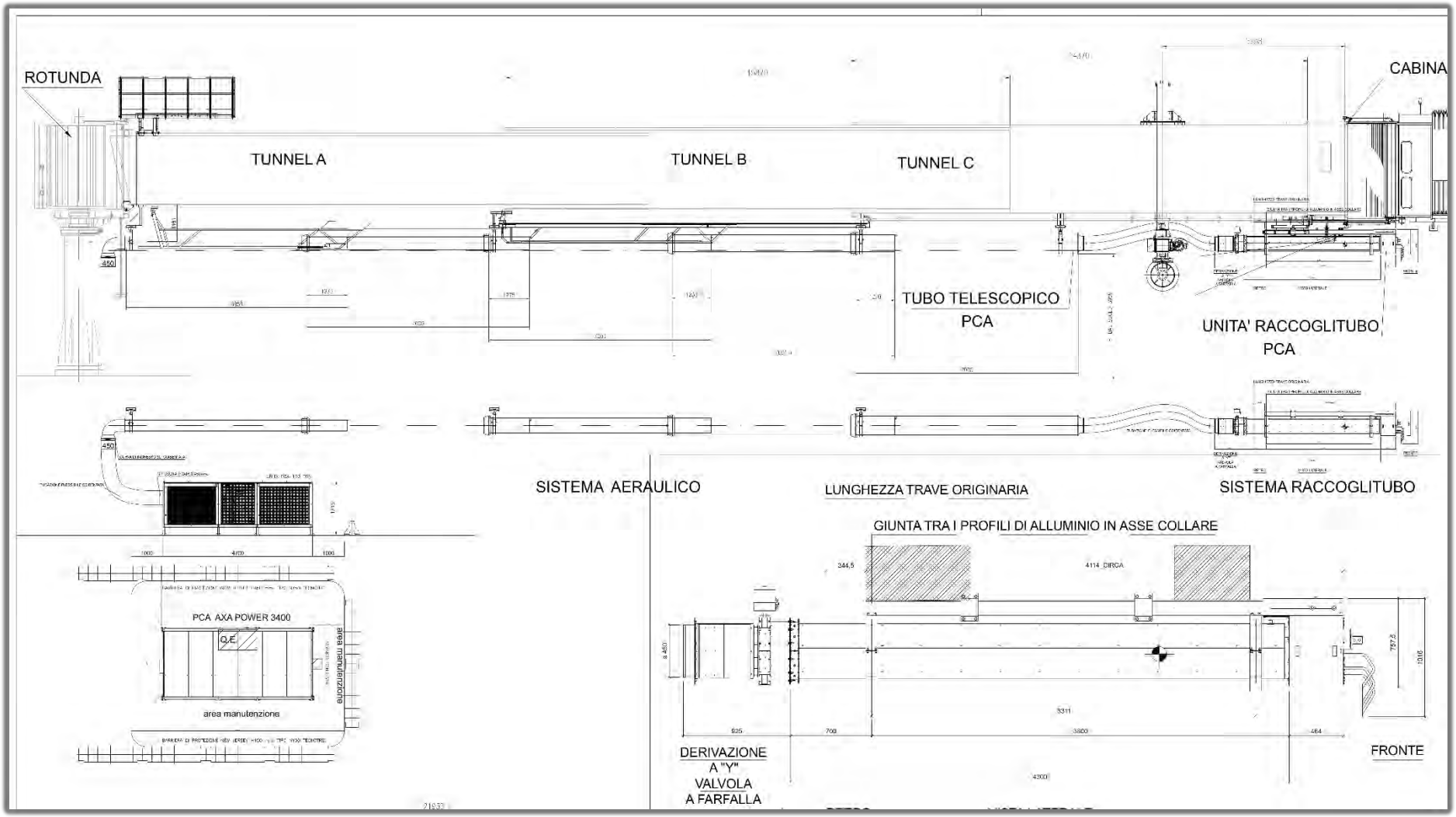
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF PREMIER AIR SOLUTIONS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SHIELD AIR SOLUTIONS, INC. IS PROHIBITED.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16"
ANGULAR DIMENSIONS ± 1.5°
TWO PLACE DECIMAL ± .06
THREE PLACE DECIMAL ± .003

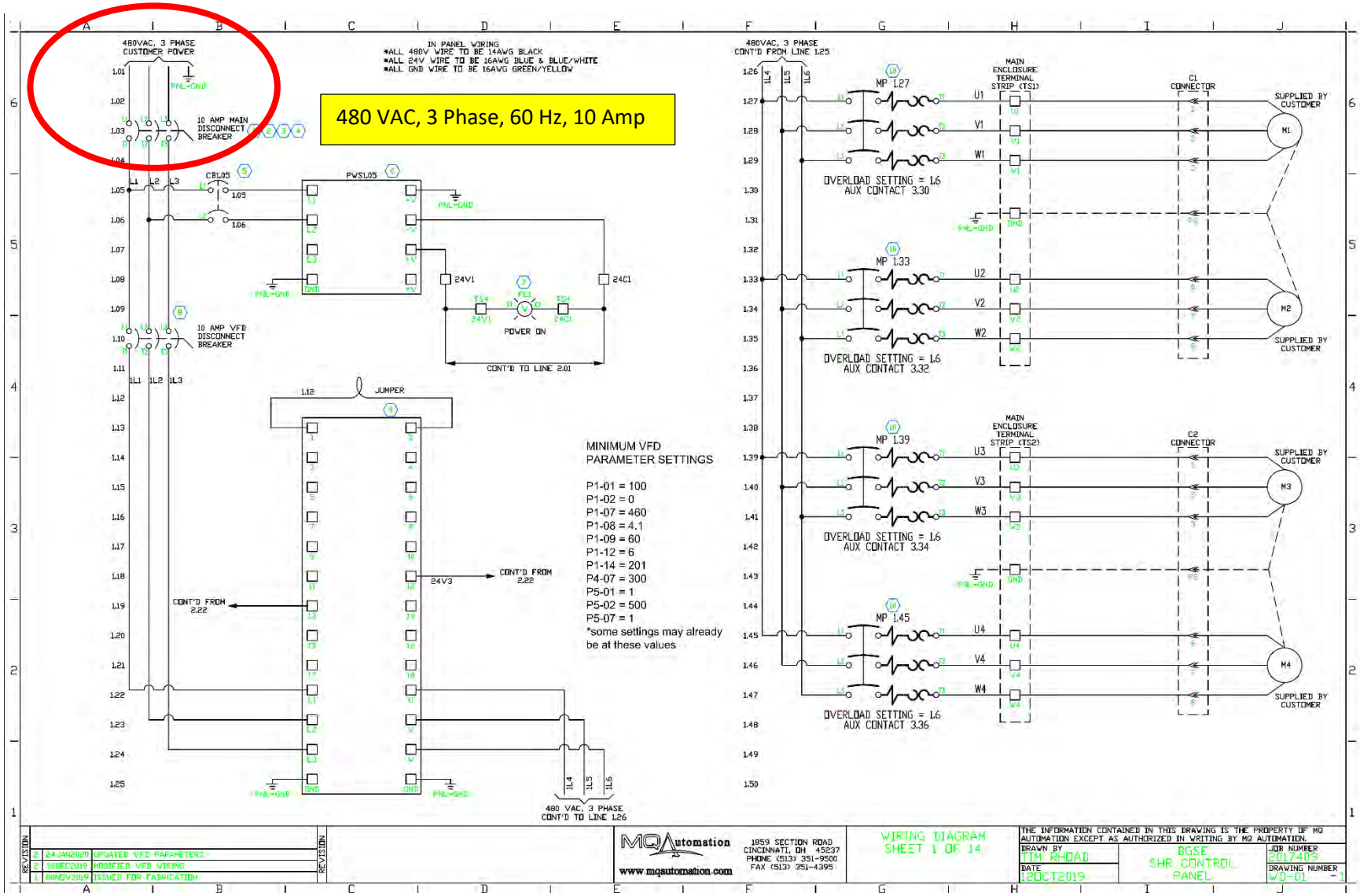
PREMIER AIR SOLUTIONS

CUSTOMER:	PO. NO:	WO. NO:	DESCRIPTION: MNT,RTRV-HOSE,THYSSEN BRIDGE,ASSY	
LOCATION:	DESIGN: WDE	11/23/19	MATERIAL:	THICKNESS:
	DRAWN: RAB	11/27/19		
MODEL NO:	APPR:		FINISH:	DRAWING NO: 400117 REV 00
	SCALE: N/A	SHEET 1 OF 1		

4.3.1.3 CIMC Tianda



4.3.2 Hose Retriever Electrical Connection



4.3.3 Removal and Out-of-Service Condition

Before removal of the Hose Retriever, make sure the electrical supply has been disconnected. The disassembling of the Hose Retriever must be performed by qualified personnel only. It is imperative that the operators respect all applicable safety precautions.

See paragraph 4.1 for storage instructions.

The disposal of the hose retriever manufacturing materials, in case of dismantling, must be the following:

- Separate and gather aluminum of outer tube, iron materials of gears, air supply hose, electric and electronic components.
- Transfer all materials to on authorized disposal facility.

CHAPTER 5 OPERATION

5.1 Safety Precautions

ELECTRIC SHOCK CAN KILL. Do not touch live electrical parts.

ELECTRIC ARC FLASH can injure the eyes, burn the skin, cause equipment damage and ignite combustible material.

IMPROPER USE can damage the Hose Retriever itself, the aircraft hose and the aircraft adaptor.

IMPORTANT

Before starting the Hose Retriever, instruct all operating and maintenance personnel about the safety precautions to be respected and about the operating and maintenance instructions listed in this manual. Everybody must carefully read the manual and be aware of all the information provided.

The manual must be kept accessible to all the operators concerned. They must be able to consult it when necessary. Operating and maintenance personnel must strictly observe all safety instructions and take all possible precautions every time they work on the Retriever.

While the Hose Retriever is operating, operators must wear no loose clothes, nor use clothes that can be caught inside the equipment; every portion of the body must be kept at a proper safety distance.

5.2 Operation

The Hose Retriever is installed under the bridge by means of a metal support fixed to the bridge frame. The Hose Retriever can be operated by means of two push-button stations: a fixed push-button station (option) generally positioned on the bridge column, beside the PCA unit control push-button station, or else included in it; a second mobile push-button station installed on the aircraft adaptor ending the air supply hose.

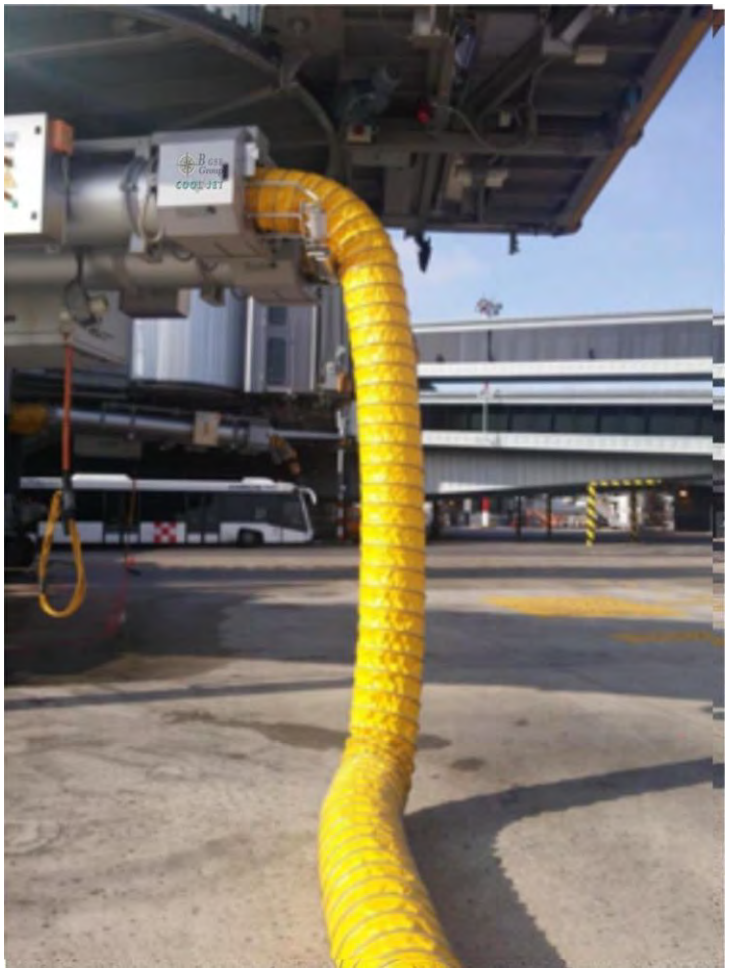
5.2.1 How to Operate the Hose Retriever

The STANDARD operating mode is by means of the mobile push button station provided on the aircraft adaptor. The fixed push-button station must be operated only on emergency occurrences as it is positioned at the rear of the unit, a position that does not allow the operator to control visually the hose outlet area. The fixed push-button station must also be used when one of the following conditions occurs:

The Hose Retriever is installed in such a high position as not to allow the operator to reach the mobile push-button station. The hose can be extracted by pressing the relevant control on the fixed push-button station (the extraction will go on only for a few seconds, after which the fixed push-button station will be disabled) allowing the operator to reach the mobile push-button station or if the mobile push-button station is faulty. If operating by the fixed push-button station is required, the presence of a second operator, assisting the retriever operation, is recommended.

During the extraction operation, the hose must always be directed towards the aircraft connection; during the retrieval, on the contrary, the hose must be directed towards the Hose Retriever inlet in order to store it properly inside.

"HOSE DISCHARGE & RETREIVAL"
Pushbuttons.



CHAPTER 6 MAINTENANCE

6.1 Safety Precautions

The Hose Retriever must be maintained in good electrical and mechanical condition. Report any eventual fault or safety hazard to supervisor and discontinue the use of the Hose Retriever until its safety conditions have been assured. Repairs should be made by trained maintenance staff only.

Before inspecting or servicing electrically powered equipment. take the following precautions

a. Shut off all power to the main switch.
b. Open the disconnect found on the operator's control panel and use a "Lockout", so that power cannot be turned on accidentally.
c. Disconnect power from the equipment if it is out of service.
d. If troubleshooting must be done with the unit energized, have another person present who is trained in turning off the equipment and providing or calling for first aid.

6.2 Maintenance Operations

The BGSE Group Cool JET® Hose Retriever has been carefully designed and tested to offer a long service life. It is a heavy-duty equipment and therefore requires only a few maintenance operations.

6.2.1 Hose Retriever Scheduled Maintenance Table

Extract the hose completely. Check it is properly positioned and proceed as follows.

DESCRIPTION:	CHECK:	TIME INTERVAL:
1. Check the proper operation of the fixed push-button station and of the mobile push-button station	Check the operation of "Hose Extraction" and "Hose Retrieval" controls on the fixed and on the mobile push-button station Check the battery charge level	2 weeks
2. Check the aircraft coupler status. Check the aircraft fixing system for proper operation	The aircraft coupler must be in good conditions. A damaged gasket can imply an airflow loss and, consequently, lower performances. Replace as necessary. Lubricate/clean the system fastening the coupler to the aircraft	2 Weeks
3. Check the control box and connected devices	Check the electrical connections. Tighten as necessary Check the pilot lights for proper operation	200 Hrs.
4. Check the overall status and the proper operation of limit switches	• The retriever must be in proper operating conditions. -Extract the hose completely to check the activation of the "hose all out" limit switch • Retrieve the hose completely to check the intervention of the "hose all in" limit switch	100 Hrs.
4.. Check the hose	Check the aircraft hose for tears, leaks, or misconnections. If necessary, replace the hose and submit for repair and / or replacement.	Continuously

6.2.2 Replacement of Radio Control Battery

The sender is powered by a long-life Lithium-ion battery, 19 Ah 3.6 V having a rated operating life of 1000 hours (at 20°C) and a warning time (weak battery) before discharging of 30 hours. To replace the battery, proceed as follows: Disassemble the radio control push-button station from its base on the aircraft adaptor.

XL-205F-Cap

NOTE: Remote Control Battery is a special-order **lithium** battery. It **CANNOT** be shipped via Airfreight. It is **RECOMMENDED** stocking this item at location!

Open the push-button station, remove the exhausted battery and replace it by a new one. Carefully realign the cover with the "O" ring on the controller so that no condensate can accumulate inside the push-button station and no water can infiltrate.

6.2.3 Replacement of the Mobile Control Push-Button Station & Frequency Synchronization with Receiver

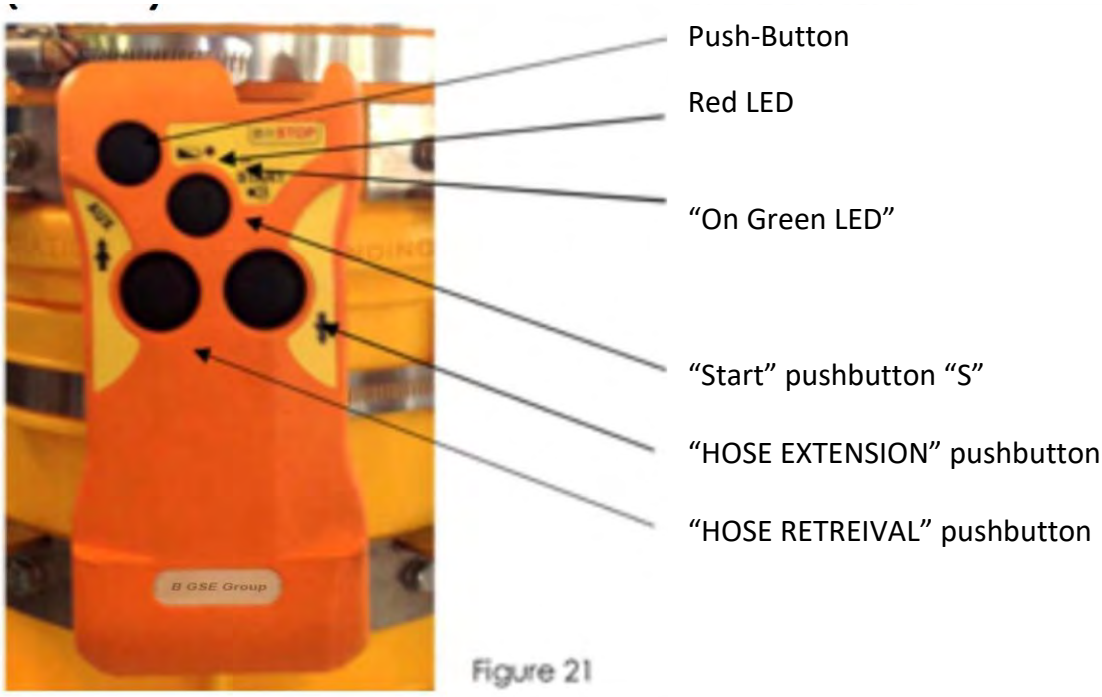


Figure 21

Disassemble the radio control sender from its base on the aircraft adaptor. Replace the sender with a new one.

Disconnect power supply from the receiver: if the receiver is electrically supplied by the control box of the Hose Retriever, turn the main switch off. Press the pushbuttons 2 and 7, then also press START at the same time and release. The green LED "ON" starts blinking rapidly. Supply power to the receiver. Wait at least ten (10+) seconds to allow the receiver to complete the procedure. When the sender detects the receiver, the "ON" green LED turns on with a steady light. Press the "START" push-button

If the new radio control sender is not operating, repeat the setting operation. Before operating the retriever, let the sender turn off automatically after 3 minutes of rest, then press "START" again. Before fixing the sender to its base, check the proper operation of the "Hose Extraction"

6.2.4 Replacement of Spiral Hoses

At the aircraft adaptor end, unscrew the two tightening collars fixing the adaptor to the cone reduction and remove the adaptor

- Fix the adaptor on the new cone and tighten the collars
- Detach the Velcro sleeve and open the zipper fixing the cone to the hose; remove the cone
- Join the new cone by closing the zipper and attaching the Velcro sleeve

6.2.4.1 Replacement of Tapered Reducer Hose Section

NOTE: The BGSE Hose Retriever is designed to accept a wide variety of available PCAir Hose manufacturer's and designs. Details of the connection my vary.!

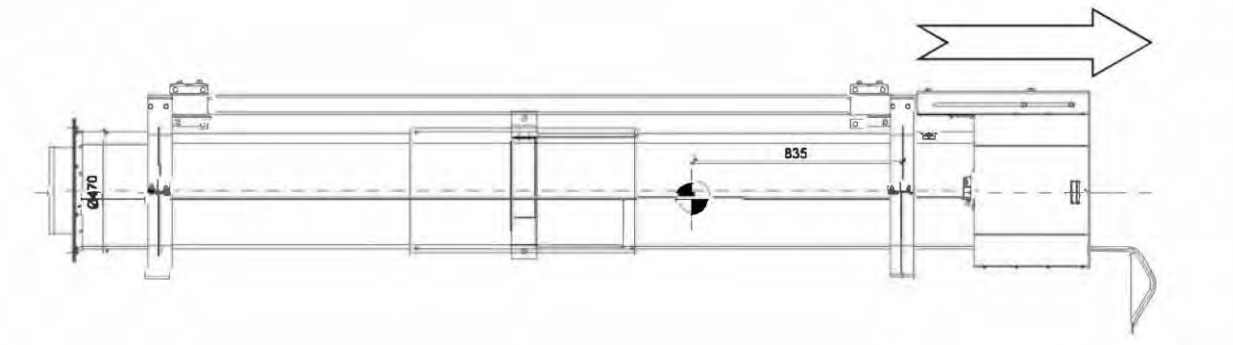
6.2.4.2 Replacement of Primary Hose Length

- Extract the hose completely
- Loosen, BUT DO NOT REMOVE, the two screws fixing the driving head

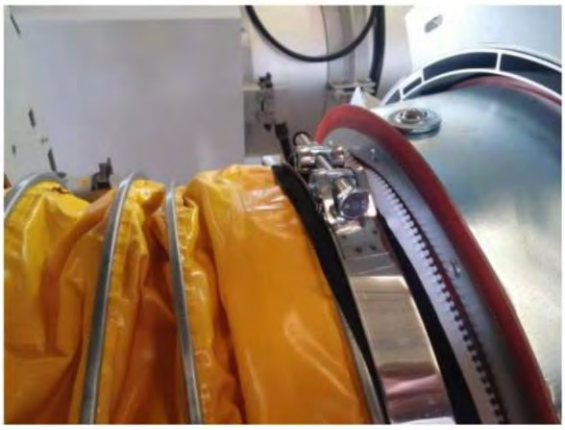
Threaded rod fixing the driving head to the mounting support

Screws (8) fixing the hose storing tube to the driving head

Remove the screws fixing the hose storing tube to the driving head and slide the head forward completely



6.2.4.3 Replacement of the First Hose Length



NOTE: The 14"/ 355mm Band Clamp is generally not available. It is easiest to utilize two (2) each 7"/ 178 mm band clamps and connect together, forming a 14" / 355 mm band clamp.

Dimensions: Diameter 14" Band Clamp= π D = **44"**
Diameter 7" Band Clamp= π D = 22" X 2 each = **44"**

- Now the collar on which the first length of hose is fixed becomes accessible. Loosen the tightening collar to release the hose
- Press the "hose extension" push-button of the radio control station, on the aircraft adaptor, and extract the hose completely out of the retriever
- Position a new hose length. Press the "hose retrieval" push-button to make the hose enter the retriever and fix the inner end on the magnetic collar by means of the tightening the collar.
- Slide the driving head backwards and tighten the fixing screws. Tighten the two screws fixing the driving head to the mounting support. To obtain the required length, complete the hose by adding further lengths.
- Connect the cone reduction and the aircraft adaptor.

6.2.5 Adjustment of Motor Belts

When a hose is replaced inside the retriever or when an adjustment is required, please proceed as follows:

1 Untighten the screws on each belt assembly, fixing the belt assembly itself in position. Adjust by an Allen screw the belt assembly, position along the adjusting eyelet, to the new position. The four belt assemblies must be fixed at the same value of the numbered dents. The same level must be set in both front and rear register. (BGSE Group hoses require 14" (365 mm) position adjustment).

2. Fully tighten the fixing screws

6.2.6 Radio Control System

The B GSE Group Hose Retriever is designed for extending and retrieving the preconditioned air spiral hose necessary to make the connection with the aircraft to be airconditioned.
Only the length necessary to connect to the aircraft will be deployed, while the hose stored inside the rigid storing tube undergoes no deformation nor causes any pressure or airflow reduction.

Control
(Details might vary)

Push-Button
Red LED
"On Green LED"
"Start" pushbutton "S"
"HOSE EXTENSION" pushbutton
"HOSE RETREIVAL" pushbutton

Figure 2

Receiver

The equipment is installed under the passenger boarding bridge.

The B GSE Group Hose Retriever, especially designed for this application, can be operated by one person only by means of a remote control station installed on the aircraft coupler. A second control station is positioned on the bridge column: it must be activated only when the aircraft coupler is in high position under the PBB and cannot be reached.

6.3 Troubleshooting

When inspecting the Hose Retriever, refer to and follow all the safety precautions listed in this manual.

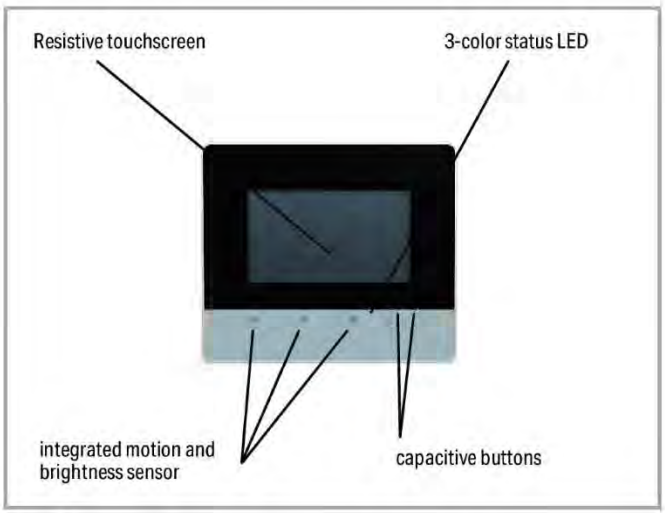
	FAULT	*POSSIBLE CAUSE*	*REMIDY*
1	The Hose Retriever can be operated by the fixed or by the mobile push-button station	Mains supply fault. No power supply to the terminals of the control box	Check the power supply cable
			Check the power supply line.
			Check the proper operation of the motors
			Check the proper operation of the variable frequency drive
		Emergency Stop Button pressed on the hose retriever control box or on the PCAir unit control box.	Release the Emergency Stop push-button
2	The Hose Retriever can be operated by one of the two push-button stations only	Faulty fixed push-button station: faulty push- buttons, broken wire	Check the line and replace the faulty push buttons as required
			Check the auxiliary relay "hose extraction" for proper operation and the "hose retrieval" relay for proper operation
			Check the contacts of "hose all in" and "hose all out" relays
3	The radio control push buttons are not operating	The radio control push-button station is out of use or faulty	Check/replace the battery
			Replace the radio-control push-button station
		The receiver is not operating	Replace the receiver
			Check the manual of the radio control system, Annex #1, at the end of this manual.
4	The Hose Retriever only operates in one direction	Faulty push-button or push-button station	Check and replace faulty push-button or push-button station
		Check the receiver; the internal relays must close	Replace as necessary
		KA7 relay contacts are not properly closed	Check the relays and replace as necessary

	FAULT	*POSSIBLE CAUSE*	*REMIDY*
		The Variable Frequency Drive is faulty	Check the Variable Frequency Drive status and replace as necessary. See the VFD manufacturer's manual
5	The motors turn, but the hose does not extract nor retrieve	he toothed belts are not properly driving the hose as contact between belt and hose is not proper	Adjust the sliding guides of the belt assemblies
6	No PBB interlock signal	The photocells are not operating.	Check the relay and replace if necessary.
7	The hose does not stop in "all in" position (high limit switch)	Check the proper operation of photocells	Cleon the photocells or replace them as necessary
		The contacts of KA7 relay are not properly open	Check and replace the relay as necessary.
8	The hose does not stop in "all out" position (low limit switch)	The contacts of KA7 relay are not properly open	Check and replace the relay as necessary
9	No PCA interlock signal	Check the contacts in the terminal board	Check the circuit in PCAir unit control box
10	The air supply hose slipped out of the retriever.	The fixing clamp is loose	Tighten the hose clamp on the inner collar.

6.4 HMI (Human Machine Interface) details

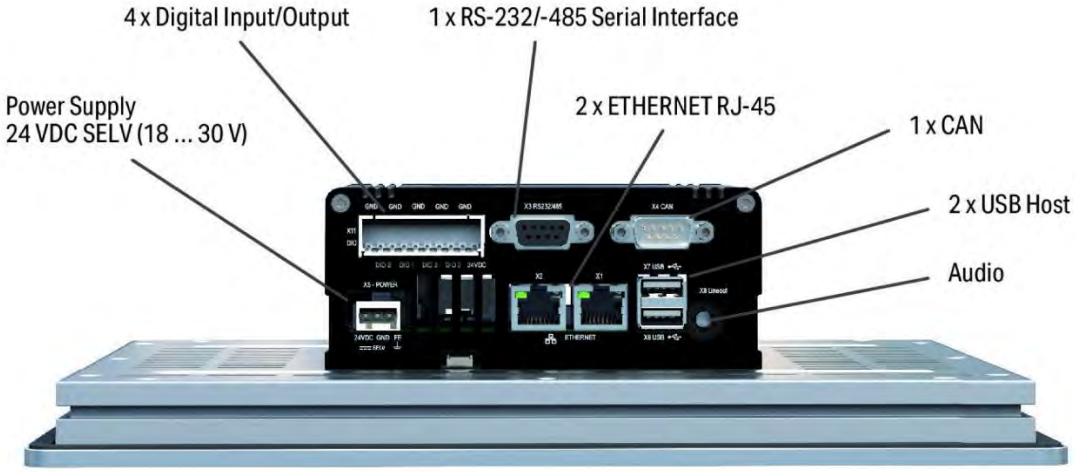
The BGSE PCAir Hose Retriever features a PLC controller with an HMI Interface. The following sections detail the various control screens available for control and monitoring of the device.

Data sheet | Item number: 762-4301/8000-002
www.wago.com/762-4301/8000-002

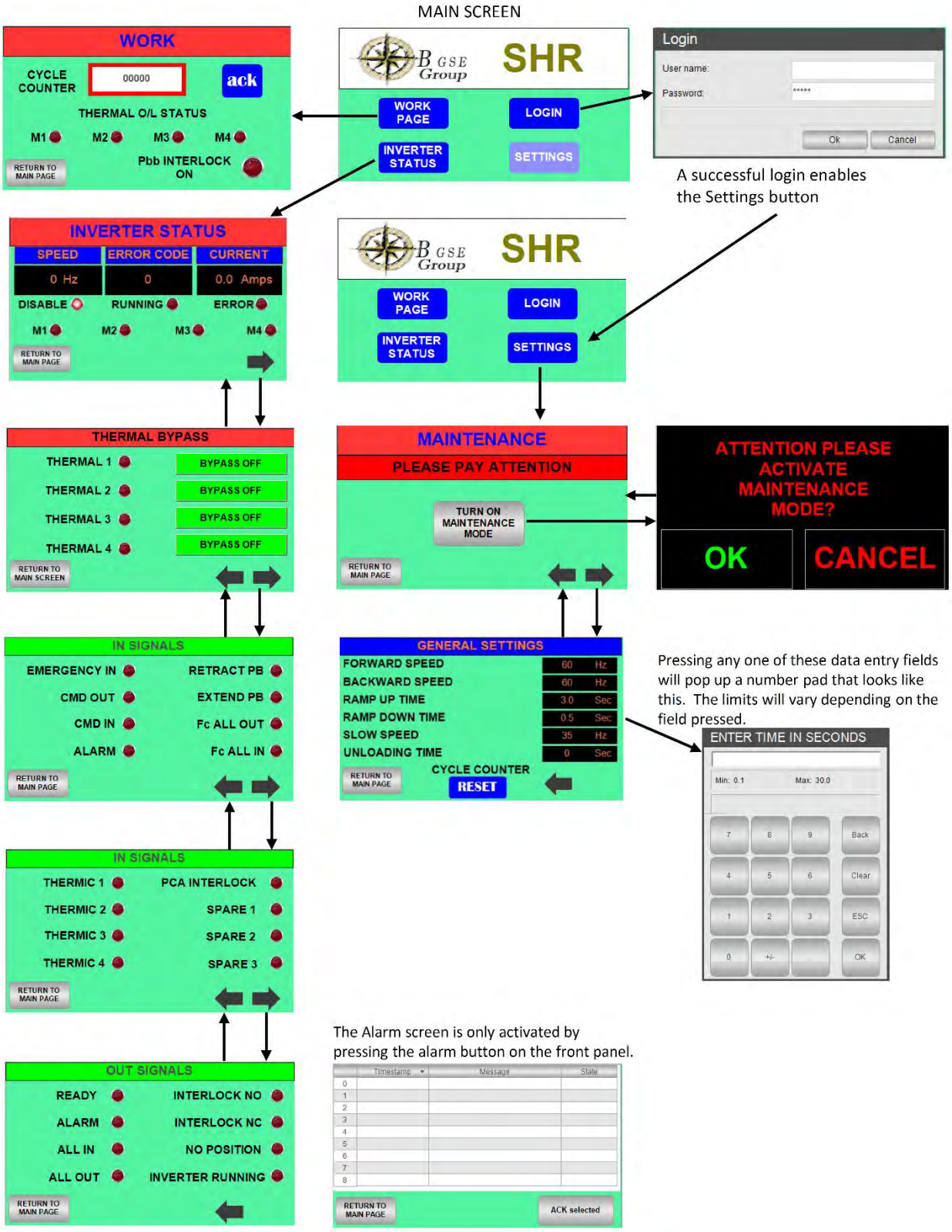


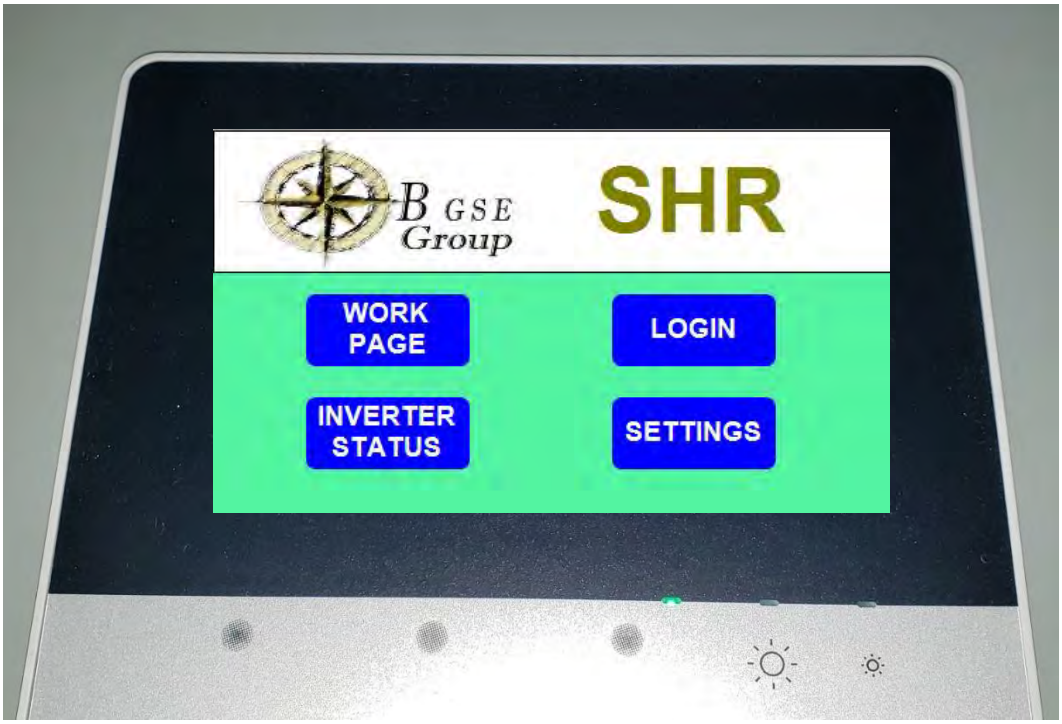
Item description
Hardware Configuration PIO3

- Two ETHERNET ports for connecting to field devices and the engineering tool
- Two USB ports for optional connection of a USB stick, mouse or keyboard
- Audio interface for connecting headphones or a loudspeaker
- CAN for controlling field devices
- RS-232/-485 interface for controlling field devices with a serial interface
- Four digital inputs/outputs for reading/triggering digital signals

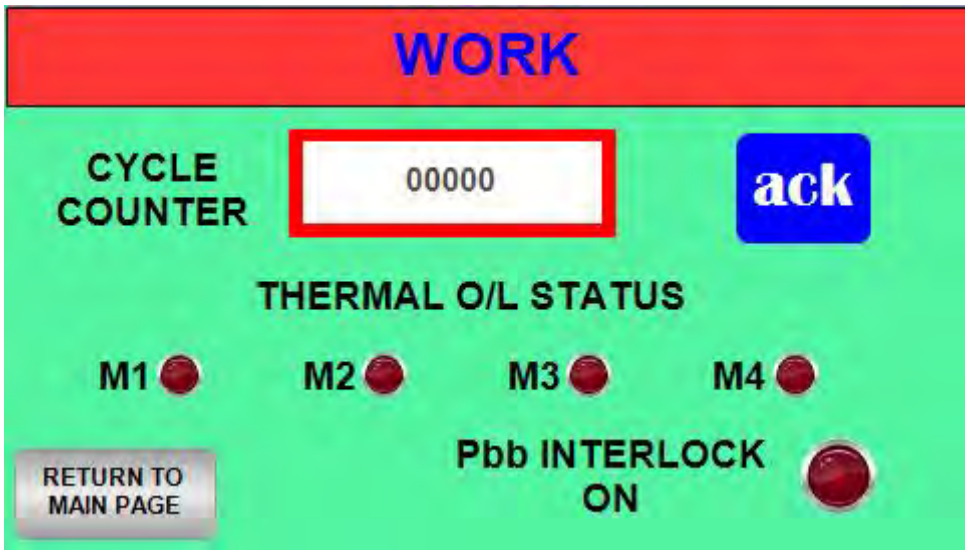


BGSE SHR HMI SCREEN FLOW





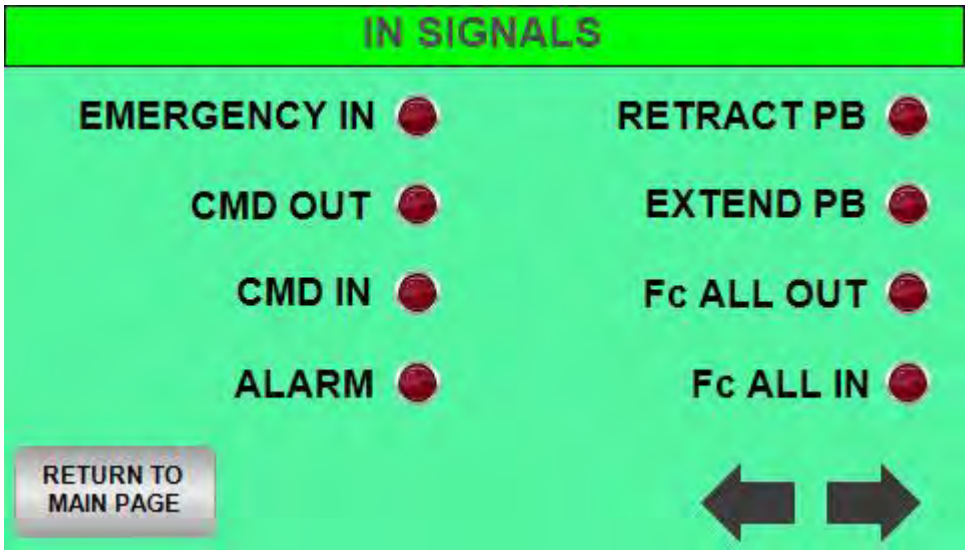
Username: admin
Password: 1234



CYCLE TIMER: Provides a numbered count of the number of times the hose has been extended and retracted. This counter can be reset by on the XX Screen.

THERMAL OVERLOAD STATUS: Indicator illuminates when an overload is encountered.

PASSENGER LOADING BRIDGE (Pbb) INTERLOCK ON: When the hose is extended, the PBB is inter-locked to prevent bridge movement.



This screen shows the status of input signals. The right arrow will advance forward a screen, the left arrow will return to the previous screen.

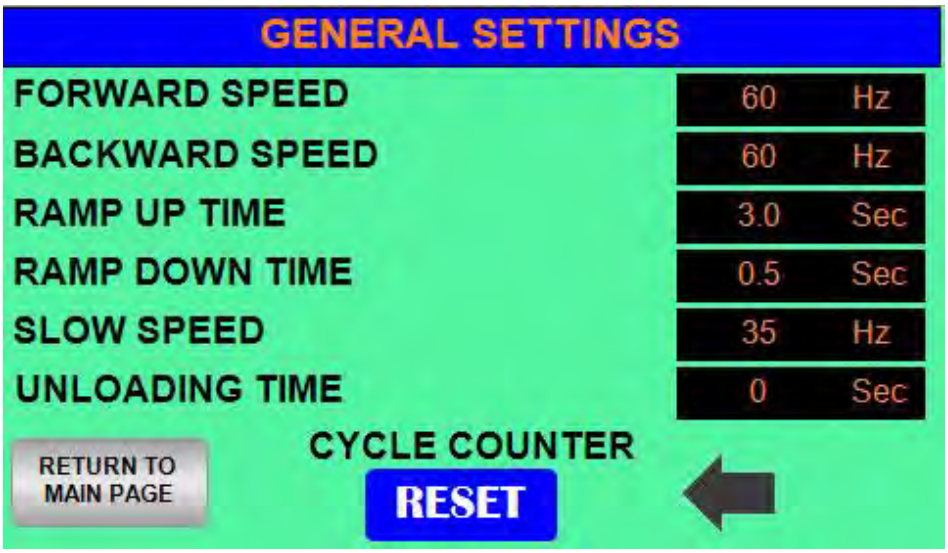
14034 Clarendon Point Court
Huntersville, NC 28078
United States of America

CARE & ATTENTION BY TRAINED PERSONNEL REQUIRED

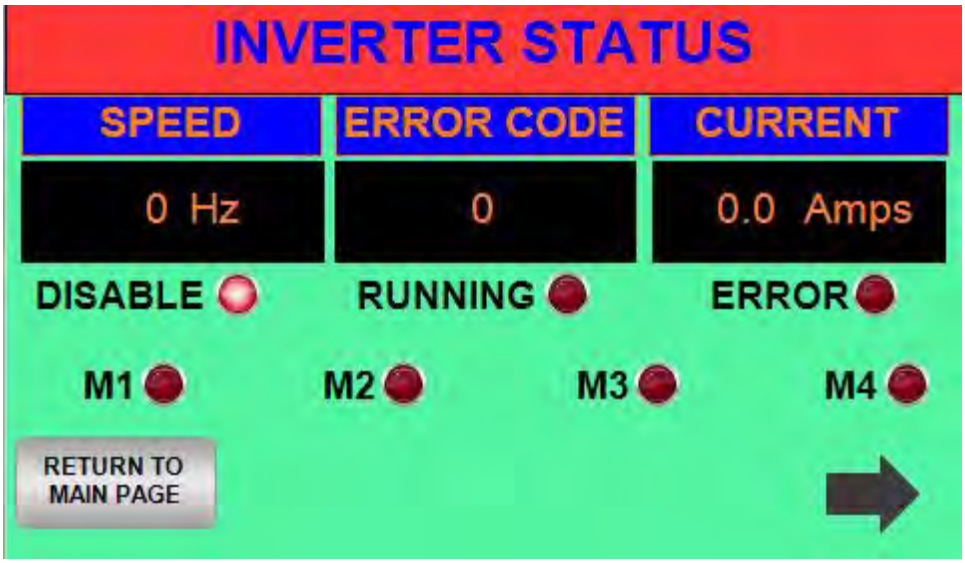
This screen allows the user to put the unit in Maintenance mode. Maintenance mode reduces the speed to 35 hz and bypasses both sensors so it will not stop at the end of the stroke. The right arrow will advance forward a screen, the left arrow will return to the previous screen.

CARE & ATTENTION BY TRAINED PERSONNEL REQUIRED

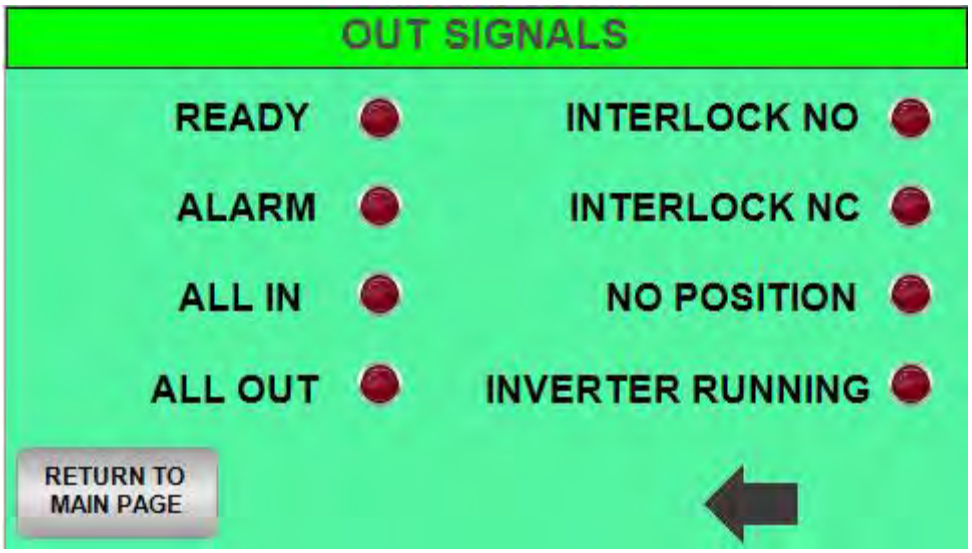
When the “Turn on Maintenance Mode” is pressed on the above screen this screen will pop up. Pressing the “Cancel” button will return to the screen with no changes. Pressing the “OK” button will place the control in maintenance mode and return to the previous screen.



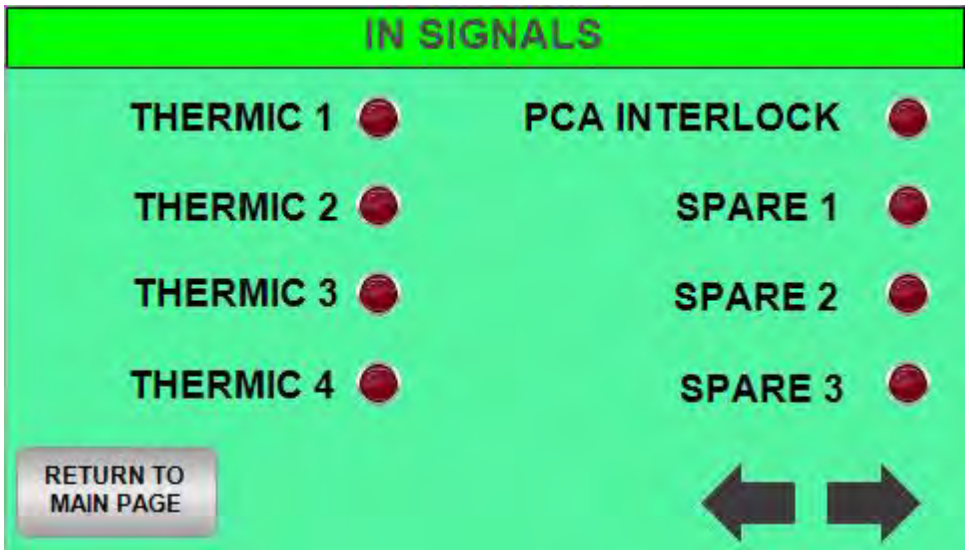
This screen allows the user to manually set parameters such as speed and ramp time. When each field is selected a number pad screen will pop up to allow the user to enter the values. The cycle counter can also be accessed from this screen. The left arrow will return to the previous screen.



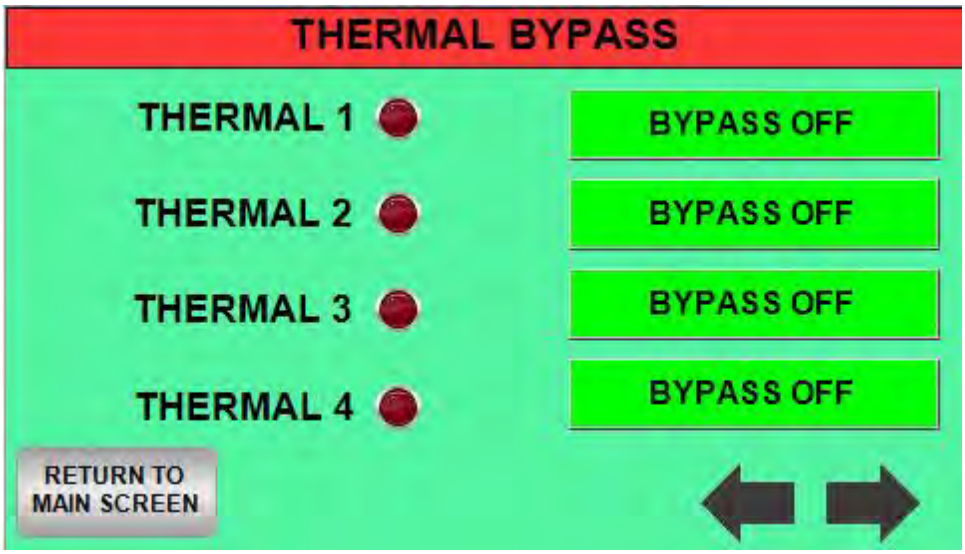
This screen shows the current speed of the motors, the current error code in the drive and the current amp draw of the motors. The error code number will correspond to the error code number in the alarm list of the VFD. The disable light indicates the drive is disabled and not communicating with the PLC. The running light indicates the motors are in motion. The Error light indicates that the VFD is sending an error signal to the PLC. The right arrow will advance forward a screen.



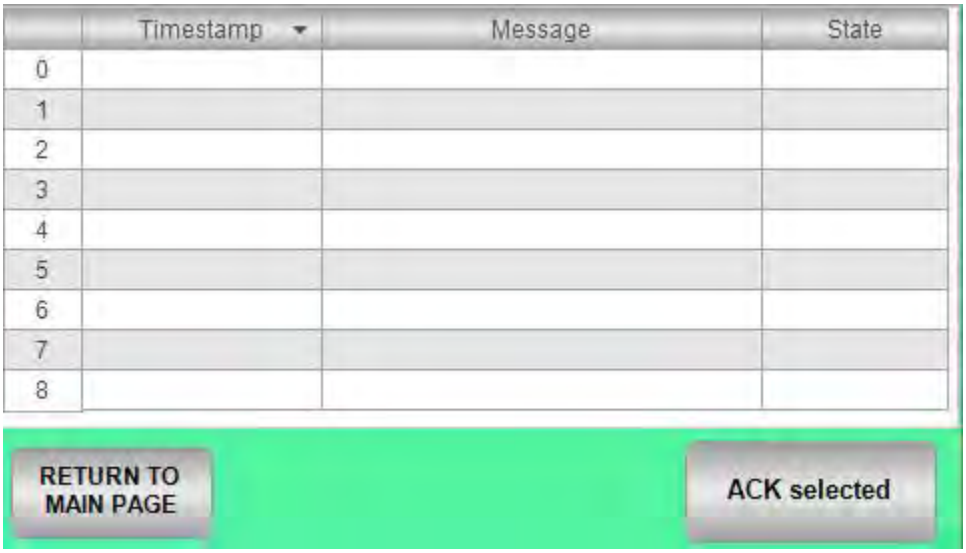
This screen shows the status of output signals. The right arrow will advance forward a screen, the left arrow will return to the previous screen.



This screen is a continuation of the status of input signals. The right arrow will advance forward a screen, the left arrow will return to the previous screen.

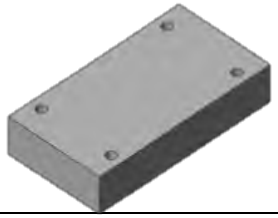


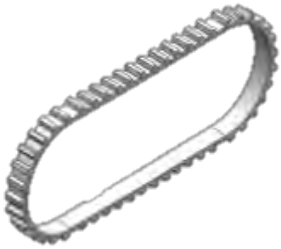
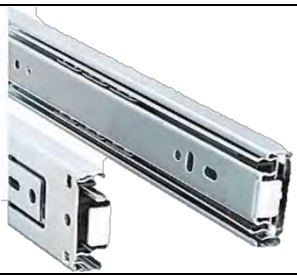
This screen shows the status of the Thermal overloads and allows a user to bypass a thermal overload that is tripped. The right arrow will advance forward a screen, the left arrow will return to the previous screen.

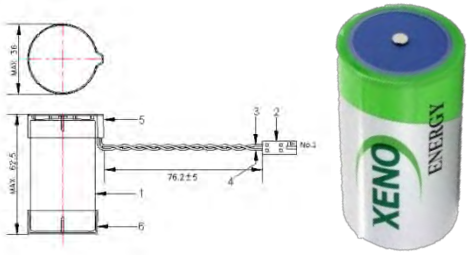


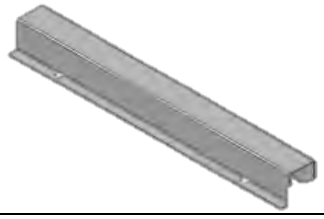
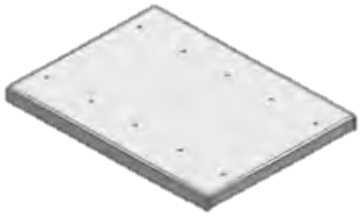
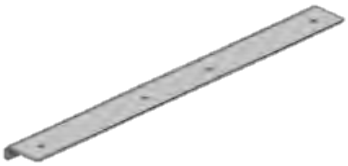
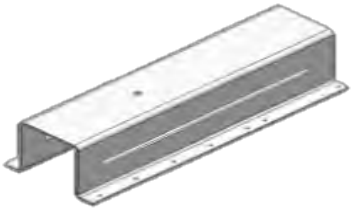
The alarm screen will pop up when the alarm button on the front panel is pressed. The alarms will show up in the list highlighted in yellow. To clear an alarm touch it on the list. It will turn green and then you can press the "ACK selected" button to delete it from the list. All items on the list can be cleared in this way.

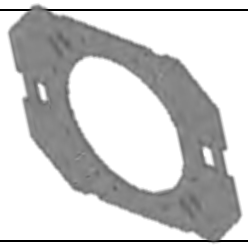
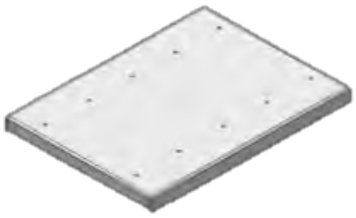
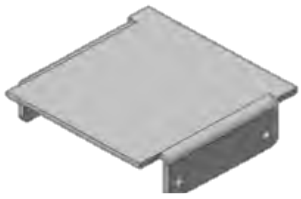
CHAPTER 7 RECOMMENDED SPARE PARTS LIST

1	79553	Idler Pulley Shaft	
2	125008	Derlin Hose Guide	
3	1000-U45-G-U142	Quarter Turn Head Unit Door Lock	
4	79554	Drive Pulley Shaft	
5	125009	Delrin Belt Center Support Guide	
6	94744A406	Motor Plate Spacer	
7	79561	Drive Pulley	

8	Southco P2-42	Head Unit Door Handles	
9	PNT-AP-3A	Proximity Sensor	
19	79573	Idler Pulley	
11	SHR 4M-01/17-MG-02-005	Toothed Motor Belt	
12	33GN80	Head Unit Door Slides	
13	J3325	J3325	
14	**SH-78ST PA**	Motor Shaft C Clip	

15	102861	1/2HP Enclosed Motor	
16			
17	XL-205F-Cap	Remote Control Battery	
18	WF180277.00	Bravo Grove Gear 1750 RPM Gear Box	
19	BEAR_6004ZZ/C3	Motor Shaft Bearing	
20	**95053A471**	2" Motor Keyway	
21	96717A220	30mm Shaft Keyway	

22	79661	Motor Threaded Adjustment Block	
23	79672	Shield Latch Bracket	
24	119003	Motor Adjustment Plate	
25	119004	Head Unit Hood Top Plate	
26	119005	Head Unit Shield Slide Bracket	
27	119006	Head Unit Hood Top Slide	
28	119007	Head Unit Left Hood Shield	

29	119008	Head Unit Right Hood Shield	
30	119009	Head Unit Hood Rear Plate	
31	119010	Head Unit Hood Plate Reinforcement Bracket	
32	119011	Head Unit Hood Front Plate	
33	119012	Head Unit Hood Bottom Plate	
34	119013	Beam End Cap	
35		Remote Control	

36	REMDEVICE T3-ECO-915	Receiver	
37	LAVOTO GA063A	Main Disconnect	
38	LAVATO GA063A	Disconnect Handle	
39	LAVATO GAX7300AN	Disconnect Shaft	
40	LAVATO GAX60B	Adapter for Pistol Grip	
41	Sprecher+Schuh L9-10/2/C	Circuit Breaker	

42		Power Supply	
43	Sprecher+Schuh D7P-P7PN3v/	Amber Pilot Light	
44	Sprecher+Schuh KTU7-D-3D-10	Motor Disconnect	
45	BARDAC P2-24020-3HF42	VFD 2 HP WITH STD	
46	Sprecher+Suhuh KTA7-25S-1.6A	Motor Overload	
47	Sprecher+Suhuh KT7-32-DB-45-4	Overload Busbar	

48	Sprecher+Suhuh D7P-MT44PX02	E-Stop Press to release	
49	WAGO 762-4301/8000-002	4.3” Web Panel	
50	AD2468-60A	60 Foot Cool JET® “flat” hose	
51	AD2468-100A	60 Foot Cool JET® “flat” hose	
52	SH1483-01	PCA Hose Tapered Adapter	
53	JB0830-48SC	Spiral 8” x 48” PCAir Hose	
54	JB0830-88SC	Spiral 8” x 48” PCAir Hose	

5	Clampco 8”	Clampco 8” Band Clamp	
56	2 Each Clampco 7”	14” Band Clamp is formed by using 2 each 7” clamps. (NOTE: Link 2 Each 7” clamps)	
57	JB730	PCAir Connector with Snap-On Gasket	
58	JB738	Snap on Gasket	
59		BGSE Adapter / Control Mount 001	

RECOMMENDED SPARE PARTS IN EXCEL

#	Part ID	Part Name
1	79553	Idler Pulley Shaft
2	125008	Derlin Hose Guide
3	1000-U45-G- U142	Quarter Turn Head Unit Door Lock
4	79554	Drive Pulley Shaft
5	125009	Delrin Belt Center Support Guide
6	94744A406	Motor Plate Spacer
7	79561	Drive Pulley
8	Southco P2-42	Head Unit Door Handles
9	PNT-AP-3A	Proximity Sensor
19	79573	Idler Pulley
11	SHR 4M-01/17- MG-02-005	Toothed Motor Belt
12	33GN80	Head Unit Door Slides
13	J3325	J3325
14	SH-78ST PA	Motor Shaft C Clip
15	102861	1/2HP Enclosed Motor
17	XL-205F-Cap	Remote Control Battery
18	WF180277.00	Bravo Grove Gear 1750 RPM Gear Box
19	BEAR_6004ZZ/C3	Motor Shaft Bearing
20	95053A471	2" Motor Keyway
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23	79672	Shield Latch Bracket
24	119003	Motor Adjustment Plate
25	119004	Head Unit Hood Top Plate
26	119005	Head Unit Shield Slide Bracket
27	119006	Head Unit Hood Top Slide
28	119007	Head Unit Left Hood Shield
29	119008	Head Unit Right Hood Shield
30	119009	Head Unit Hood Rear Plate
31	119010	Head Unit Hood Plate Reinforcement Bracket
32	119011	Head Unit Hood Front Plate
33	119012	Head Unit Hood Bottom Plate
34	119013	Beam End Cap
35	BGSE SHR 001 Remote	Remote Control
36	REMDEVICE T3- ECO-915	Receiver
37	LAVOTO GA063A	Main Disconnect
38	LAVATO GA063A	Disconnect Handle

#	Part ID	Part Name
39	LAVATO GAX7300AN	Disconnect Shaft
40	LAVATO GAX60B	Adapter for Pistol Grip
41	Sprecher+Schuh L9-10/2/C	Circuit Breaker
42	Sprecher + Schuh / BGSE Power supply SHR	Power Supply
43	Sprecher+Schuh D7P-P7PN3v/	Amber Pilot Light
44	Sprecher+Schuh KTU7-D-3D-10	Motor Disconnect
45	BARDAC P2- 24020-3HF42	VFD 2 HP WITH STD
46	Sprecher+Schuh KTA7-25S-1.6A	Motor Overload
47	Sprecher+Schuh KT7-32-DB-45-4	Overload Busbar
48	Sprecher+Schuh D7P-MT44PX02	E-Stop Press to release
49	WAGO 762- 4301/8000-002	4.3” Web Panel
50	AD2468-60A	60 Foot Cool JET® “flat” hose
51	AD2468-100A	60 Foot Cool JET® “flat” hose
52	SH1483-01	PCA Hose Tapered Adapter
53	JB0830-48SC	Spiral 8” x 48” PCAir Hose
54	JB0830-88SC	Spiral 8” x 48” PCAir Hose
5	Clampco 8”	Clampco 8” Band Clamp
56	2 Each Clampco 7”	14” Band Clamp is formed by using 2 each 7” clamps. (NOTE: Link 2 Each 7” clamps)
57	JB730	PCAir Connector with Snap- On Gasket
58	JB738	Snap on Gasket
59	BGSE SHR Remote mount	BGSE Adapter / Control Mount 001

CHAPTER 8 WIRING DIAGRAMS

BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION
1	1	LOVATO	GA063A	MAIN DISCONNECT	31	57	WAGO	2002-1201	GREY TERMINAL BLOCK	61	1	PANDUIT	F1.5X2LG6	1.5"x2" WIRE DUCT 15"
2	1	LOVATO	GAX66N	DISCONNECT HANDLE	32	5	WAGO	2002-1291	END BARRIER	62	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 15"
3	1	LOVATO	GAX7300AN	DISCONNECT SHAFT	33	11	WAGO	249-116	END CLAMP	63				
4	1	LOVATO	GAX60B	ADAPTER FOR PISTOL GRIP	34	6	WAGO	2002-1207	GROUND TERMINAL BLOCK	64				
5	1	SPRECHER & SCHUH	L9-10/2/C	CIRCUIT BREAKER	35	2	WAGO	2002-405	5 POSITION JUMPER	65				
6	1	WAGO	787-1628	POWER SUPPLY	36	1	WAGO	2002-402	2 POSITION JUMPER	66				
7	1	SPRECHER & SCHUH	D7P-P7PN3W	AMBER PILOT LIGHT	37	4	IGUS	I-BVND-M207GT	21.2MM OD CONNECTOR M20	67				
8	1	SPRECHER & SCHUH	KTU7-D-3D-10	MOTOR DISCONNECT	38	140	IGUS	I-CYLT-17B	PMA PLASTIC CONDUIT	68				
9	1	BARDAC	P2-24020-3HF42	VFD 2 HP WITH STO	39	2	MENCOM	2M20PA/SW	M20 PLASTIC NUT	69				
10	1	SPRECHER & SCHUH	KTA7-25S-1.6A	MOTOR OVERLOAD	40	3	MENCOM	CRB-16PA/SW	PG16 PLASTIC HOLE FILLER	70				
11	1	SPRECHER & SCHUH	KT7-32-DB-45-4	OVERLOAD BUSBAR	41	2	MENCOM	PCG-11-B	PG11 CORD GRIP & NUT	71				
12	1	SPRECHER & SCHUH	D7P-MT44PX02	E-STOP TWIST TO RELEASE	42	7	MENCOM	316G	PG16 "O" RING	72				
13	1	WAGO	762-4301/8000-002	4.3" WEB PANEL	43	1	EXM	5412ESSP242410	24x24x10 SS ENCLOSURE	73				
14	1	WAGO	750-602	POWER FEED MODULE	44	1	EXM	881 SP2424	24x24 SUB PANEL	74				
15	1	WAGO	750-362	MODBUS BUS COUPLER	45	1	EXM	880-BD1	ENCLOSURE DRAIN	75				
16	1	WAGO	750-600	END MODULE	46					76				
17	1	REMDEVICE	T3-ECO-915	REMOTE CONTROLRECEIVER	47					77				
18	1	WAGO	750-1406	16PT INPUT MODULE	48	1	WAGO	210-112	35MM DIN RAIL 8-1/2"	78				
19		SPRECHER & SCHUH	D7P-LF4PN3RX10	RED LIGHTED PB	49	1	WAGO	210-112	35MM DIN RAIL 9-1/4"	79				
20	2	SPRECHER & SCHUH	D7P-LF5PN3WX10	YELLOW LIGHTED PB	50	1	WAGO	210-112	35MM DIN RAIL 4-3/4"	80				
21					51	1	WAGO	210-112	35MM DIN RAIL 3-1/2"	81				
22	1	SPRECHER & SCHUH	KT7-PE1-10	MOTOR OL AUX CONTACT	52	1	WAGO	210-112	35MM DIN RAIL 13-3/4"	82				
23	1	WAGO	750-530	8PT OUTPUT CARD	53	1	PANDUIT	F1X2LG6	1"x2" WIRE DUCT 20-3/4"	83				
24	3	SPRECHER & SCHUH	D7P-P3PN3G	GREEN PILOT LIGHT	54	1	PANDUIT	C1LG6	1" DUCT COVER 20-3/4"	84				
25					55	1	PANDUIT	F1.5X2LG6	1.5"x2" WIRE DUCT 9-1/4"	85				
26	1	WAGO	750-515	4PT RELAY OUTPUT CARD	56	1	PANDUIT	C1.5LG6	1" DUCT COVER 9-1/4"	86				
27	1	ILME	MHD-10.21	10 PIN CONNECTOR HOOD	57	1	PANDUIT	F1X2LG6	1"x2" WIRE DUCT 15"	87				
28	1	ILME	CNEF-10T	10 PIN FEMALE CONNECTOR	58	1	PANDUIT	C1LG6	1" DUCT COVER 15"	88				
29	1	ILME	CHP-10	10 PIN DOUBLE LATCH BASE	59	1	PANDUIT	F1.5X2LG6	1.5"x2" WIRE DUCT 5-1/8"	89				
30	1	ILME	CNEM-10T	10 PIN MALE CONNECTOR	60	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 5-1/8"	90				

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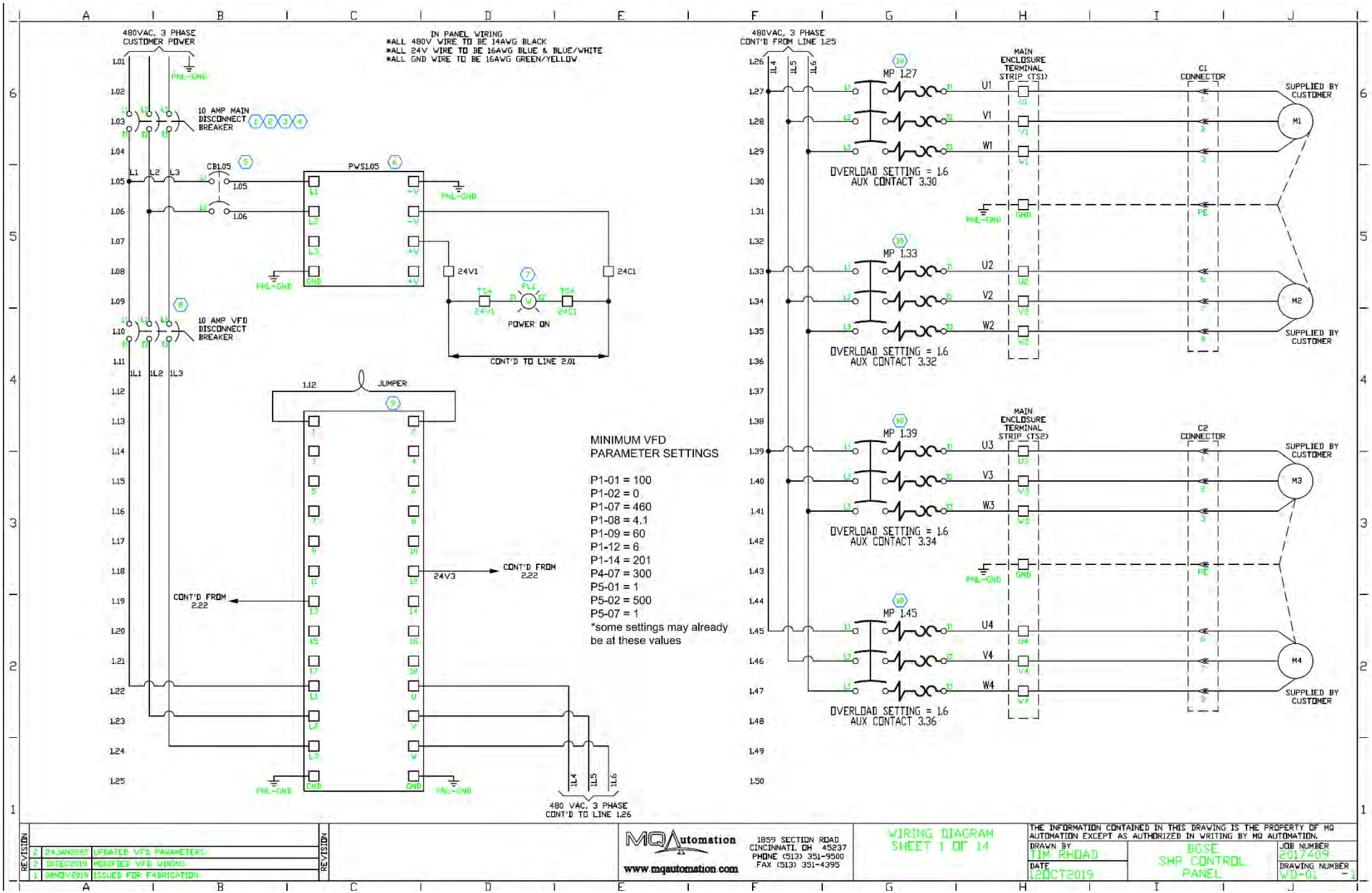
BOM
SHEET 14 OF 14

DRAWN BY: TIM RHOAD
DATE: 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER: 2017409
DRAWING NUMBER: W014 -1


480VAC, 3 PHASE CUSTOMER POWER
IN PANEL WIRING
*ALL 480V WIRE TO BE 14AWG BLACK
*ALL 24V WIRE TO BE 16AWG BLUE & BLUE/WHITE
*ALL GND WIRE TO BE 16AWG GREEN/YELLOW
10 AMP MAIN DISCONNECT BREAKER
CB1.05
PWS1.05
24V1
24C1
POWER ON
CONT'D TO LINE 2.01
10 AMP VFD DISCONNECT BREAKER
JUMPER
CONT'D FROM 2.22
24V3
CONT'D FROM 2.22
480 VAC, 3 PHASE CONT'D TO LINE 1.26
MINIMUM VFD PARAMETER SETTINGS
P1-01 = 100
P1-02 = 0
P1-07 = 460
P1-08 = 4.1
P1-09 = 60
P1-12 = 6
P1-14 = 201
P4-07 = 300
P5-01 = 1
P5-02 = 500
P5-07 = 1
*some settings may already be at these values
480VAC, 3 PHASE CONT'D FROM LINE 1.25
MP 1.27
MP 1.33
MP 1.39
MP 1.45
MAIN ENCLOSURE TERMINAL STRIP (TS1)
MAIN ENCLOSURE TERMINAL STRIP (TS2)
C1 CONNECTOR
C2 CONNECTOR
OVERLOAD SETTING = 1.6
AUX CONTACT 3.30
AUX CONTACT 3.32
AUX CONTACT 3.34
AUX CONTACT 3.36
SUPPLIED BY CUSTOMER
M1
M2
M3
M4
REVISION
2 24JAN2020 UPDATED VFD PARAMETERS
1 08NOV2019 ISSUED FOR FABRICATION
MQ Automation
1859 SECTION ROAD CINCINNATI, OH 45237 PHONE (513) 351-9500 FAX (513) 351-4395
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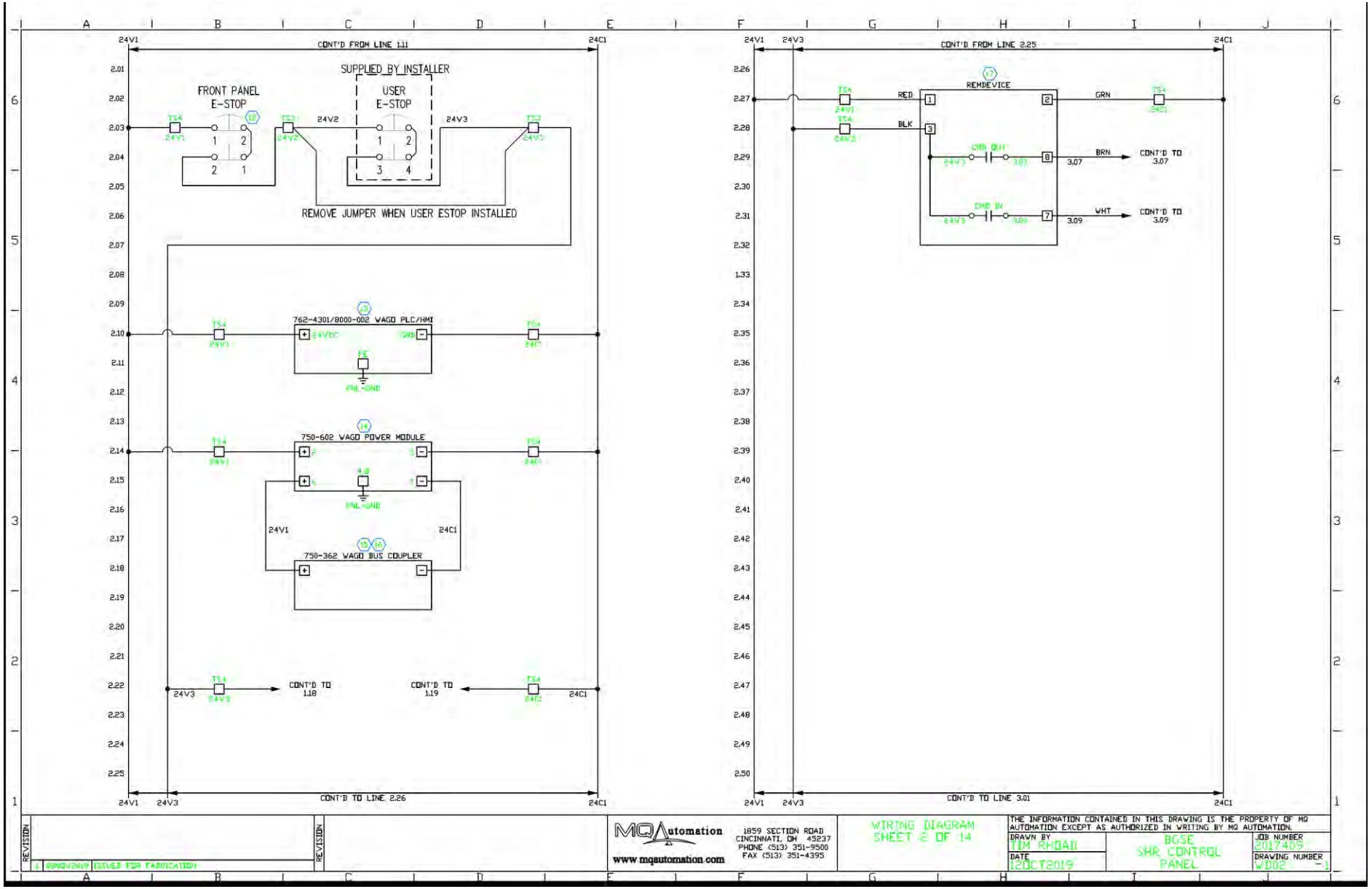
WIRING DIAGRAM SHEET 1 OF 14
THE INFORMATION CONTAINED IN THIS DRAWING IS THE PROPERTY OF MQ AUTOMATION EXCEPT AS AUTHORIZED IN WRITING BY MQ AUTOMATION.
DRAWN BY TIM RHOAD
DATE 12OCT2019
BGSE SHP CONTROL PANEL
JOB NUMBER 2017409
DRAWING NUMBER WD-01


CONT'D FROM LINE 1.11
SUPPLIED BY INSTALLER
FRONT PANEL E-STOP
USER E-STOP
REMOVE JUMPER WHEN USER ESTOP INSTALLED
762-4301/8000-002 WAGO PLC/HMI
750-602 WAGO POWER MODULE
750-362 WAGO BUS COUPLER
CONT'D TO 1.18
CONT'D TO 1.19
CONT'D TO LINE 2.26
CONT'D FROM LINE 2.25
REMDEVICE
RED
BLK
GRN
BRN
WHT
CONT'D TO 3.07
CONT'D TO 3.09
CONT'D TO LINE 3.01
MQ Automation
1859 SECTION ROAD
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WIRING DIAGRAM
SHEET 2 OF 14
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DRAWN BY TIM RHOAD
DATE 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER 2017409
DRAWING NUMBER WD02 -1
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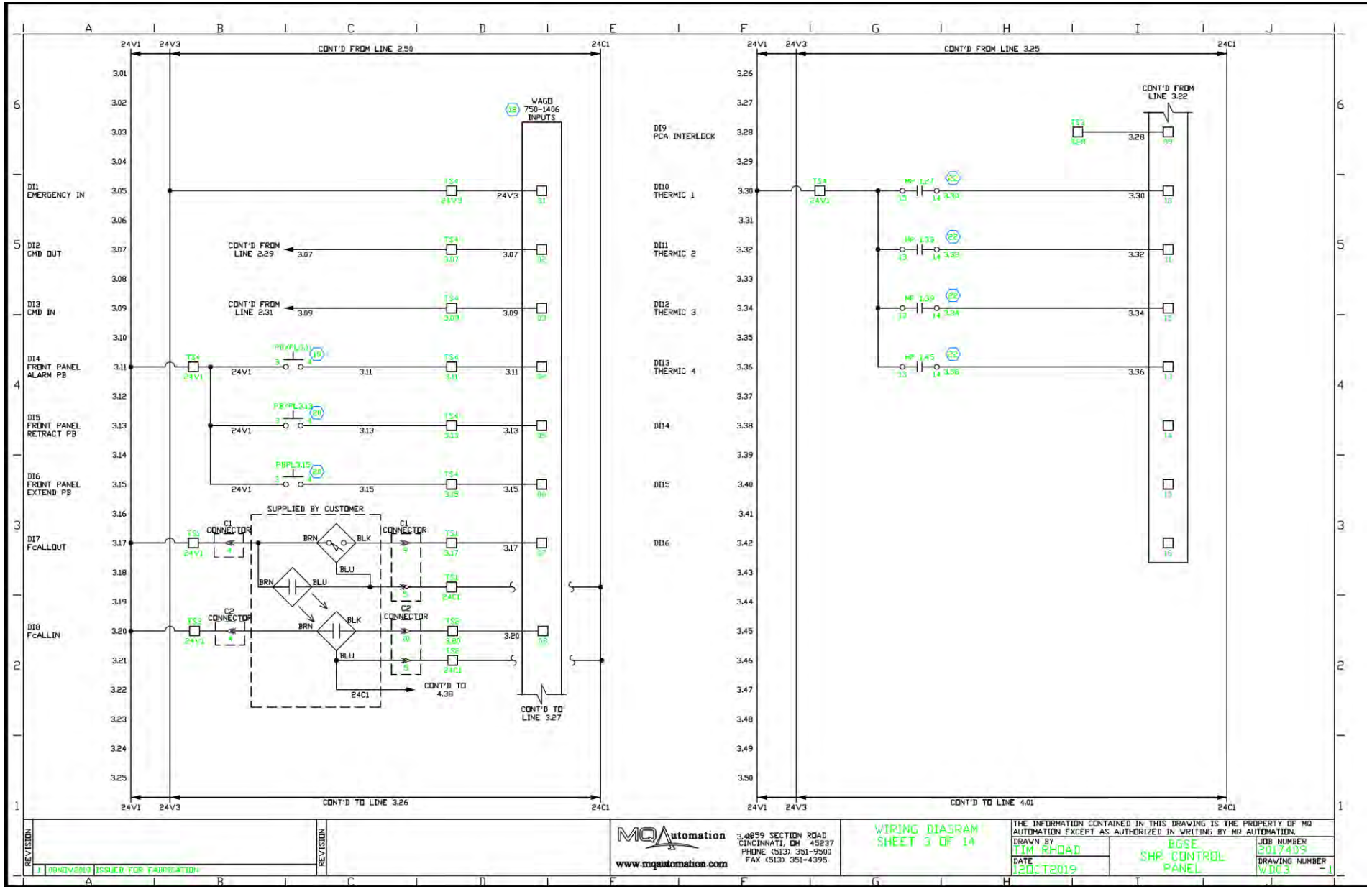
CONT'D FROM LINE 2.50
CONT'D FROM LINE 3.25
WAGO 750-1406 INPUTS
DI1 EMERGENCY IN
DI2 CMD OUT
DI3 CMD IN
DI4 FRONT PANEL ALARM PB
DI5 FRONT PANEL RETRACT PB
DI6 FRONT PANEL EXTEND PB
DI7 FCALLOUT
DI8 FCALLIN
SUPPLIED BY CUSTOMER
C1 CONNECTOR
C2 CONNECTOR
BRN
BLK
BLU
CONT'D TO 4.38
CONT'D TO LINE 3.27
CONT'D FROM LINE 2.29
CONT'D FROM LINE 2.31
CONT'D FROM LINE 3.22
DI9 PCA INTERLOCK
DI10 THERMIC 1
DI11 THERMIC 2
DI12 THERMIC 3
DI13 THERMIC 4
DI14
DI15
DI16
CONT'D TO LINE 3.26
CONT'D TO LINE 4.01
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1 08NOV2019 ISSUED FOR FABRICATION
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WIRING DIAGRAM
SHEET 3 OF 14
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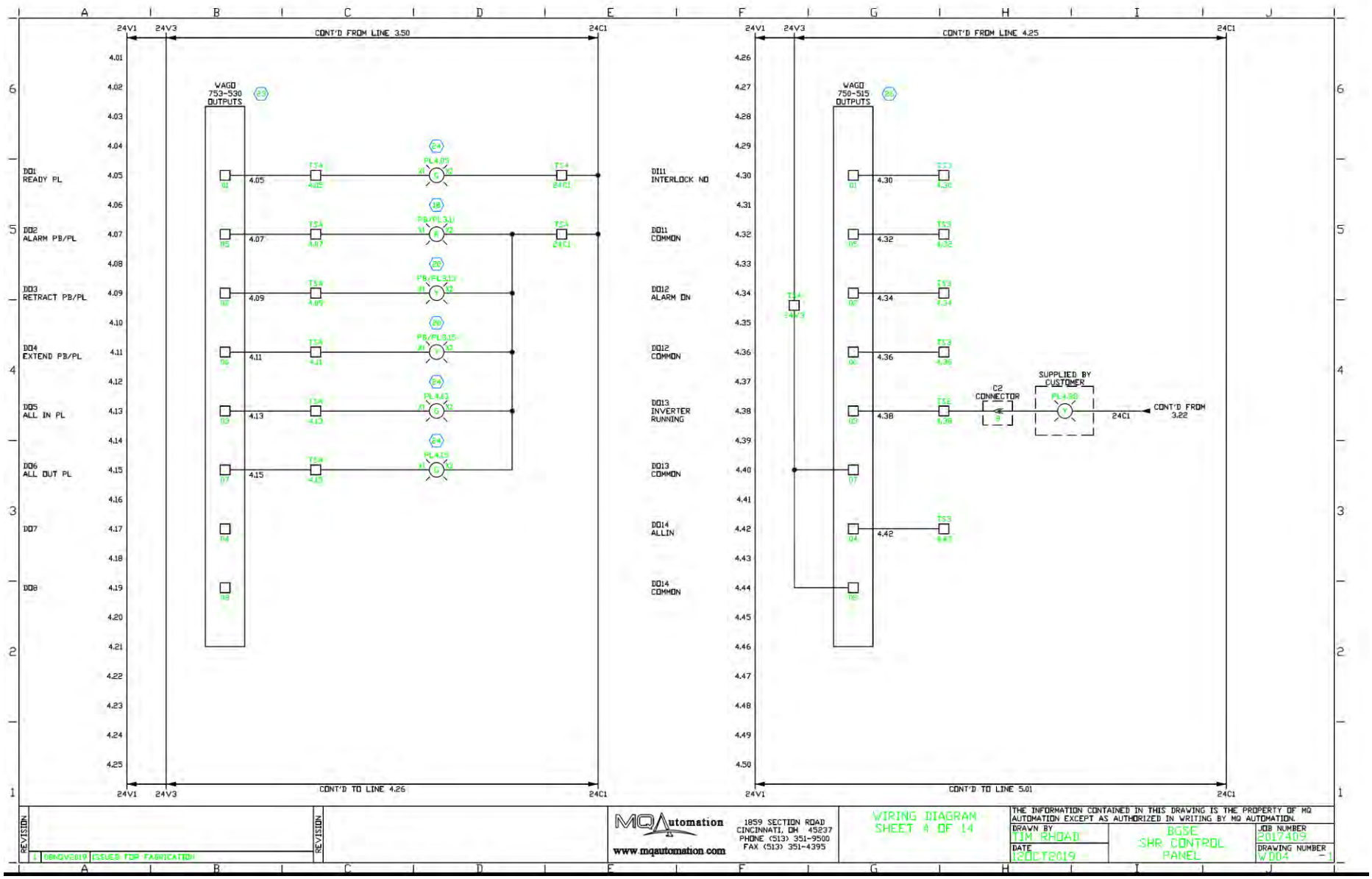
DRAWN BY TIM RHOAD
DATE 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER 2017405
DRAWING NUMBER W003 -1


CONT'D FROM LINE 3.50
CONT'D TO LINE 4.26
CONT'D FROM LINE 4.25
CONT'D TO LINE 5.01
WAGO 753-530 OUTPUTS
WAGO 750-515 OUTPUTS
DO1 READY PL
DO2 ALARM PB/PL
DO3 RETRACT PB/PL
DO4 EXTEND PB/PL
DO5 ALL IN PL
DO6 ALL OUT PL
DO7
DO8
DI11 INTERLOCK NO
DI11 COMMON
DI12 ALARM ON
DI12 COMMON
DI13 INVERTER RUNNING
DI13 COMMON
DI14 ALLIN
DI14 COMMON
C2 CONNECTOR
SUPPLIED BY CUSTOMER
CONT'D FROM 3.22
MQAutomation
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WIRING DIAGRAM
SHEET 4 OF 14
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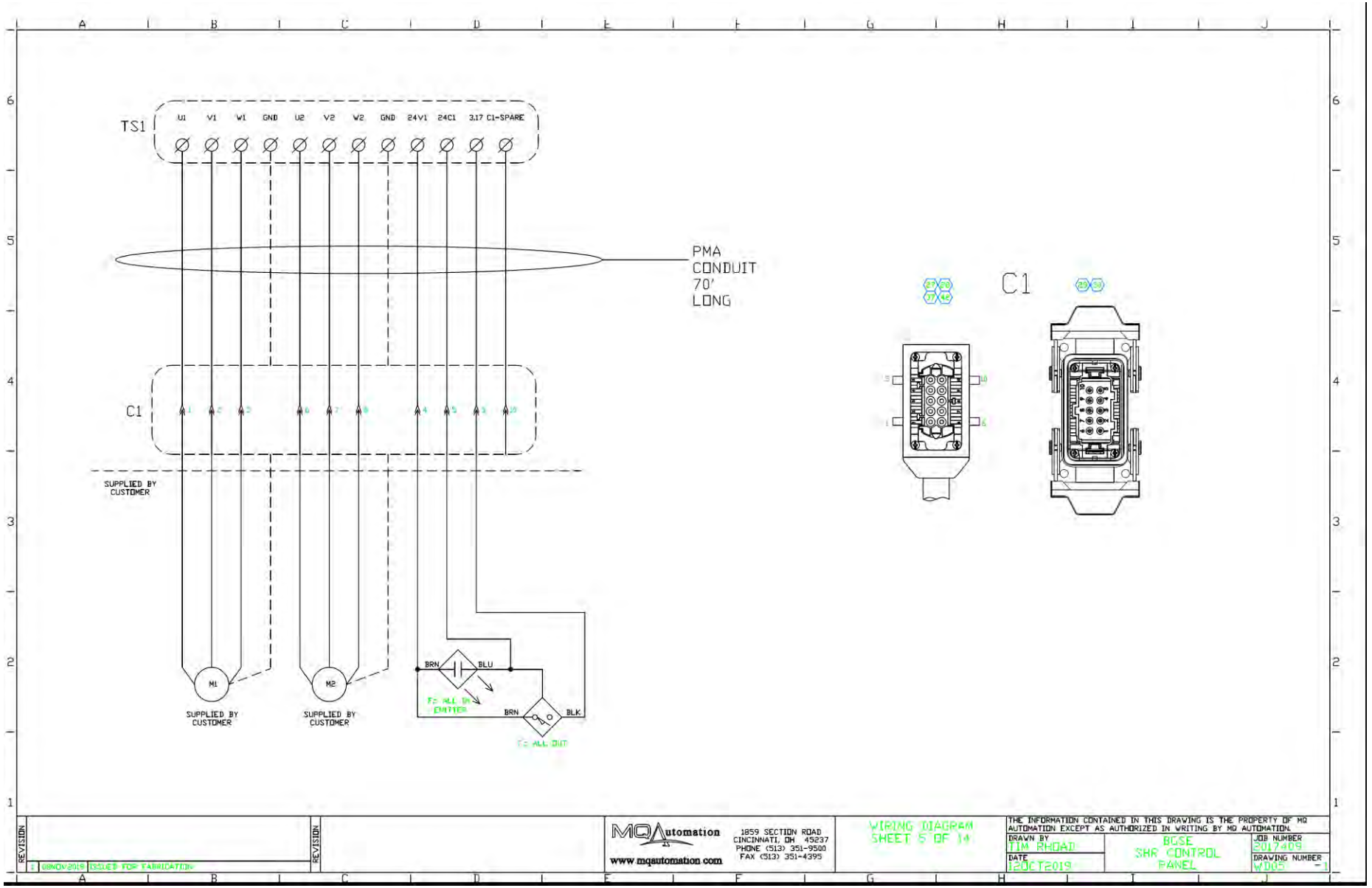
DRAWN BY TIM RHOAD
DATE 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER 2012409
DRAWING NUMBER W004 -1
REVISION
1 08NOV2019 ISSUED FOR FABRICATION


TS1
U1 V1 W1 GND U2 V2 W2 GND 24V1 24C1 3,17 C1-SPARE
PMA
CONDUIT
70'
LONG
C1
SUPPLIED BY
CUSTOMER
M1
M2
SUPPLIED BY
CUSTOMER
SUPPLIED BY
CUSTOMER
BRN
BLU
BRN
BLK
TO ALL IN
EMITTER
TO ALL OUT
C1
MQ Automation
1859 SECTION ROAD
CINCINNATI, OH 45237
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FAX (513) 351-4395
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WIRING DIAGRAM
SHEET 5 OF 14
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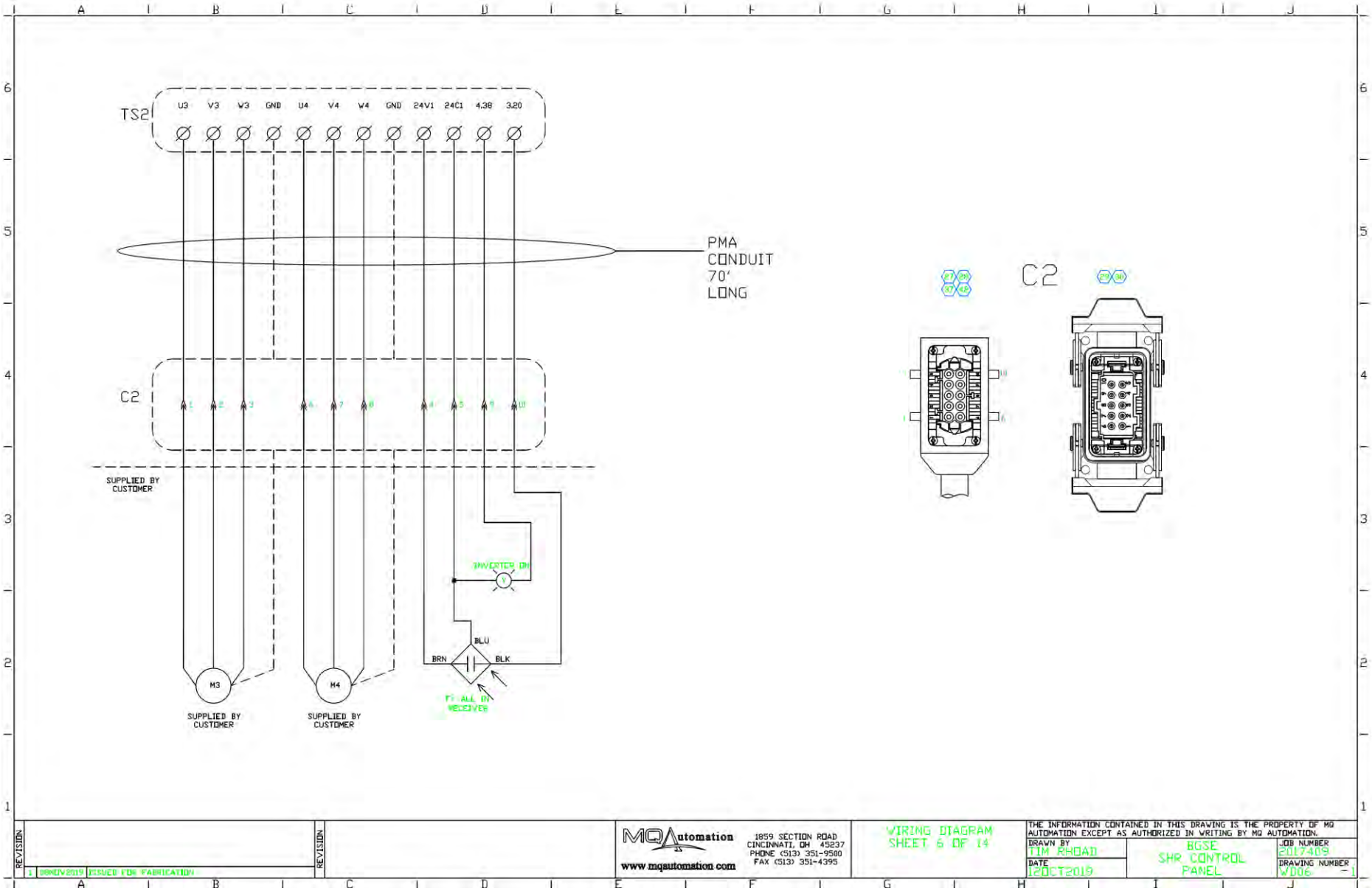
DRAWN BY
TIM RHOAD
DATE
12OCT2019
BGSE
SHR CONTROL
PANEL
JOB NUMBER
2017409
DRAWING NUMBER
WD05 -1
REVISION
1 08NOV2019 ISSUED FOR FABRICATION


TS2
U3
V3
W3
GND
U4
V4
W4
GND
24V1
24C1
4,38
3,20
PMA
CONDUIT
70'
LONG
C2
SUPPLIED BY
CUSTOMER
INVERTER ON
BLU
BRN
BLK
M3
M4
SUPPLIED BY
CUSTOMER
SUPPLIED BY
CUSTOMER
C2
REVISION
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SHEET 6 OF 14
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DATE
12OCT2019
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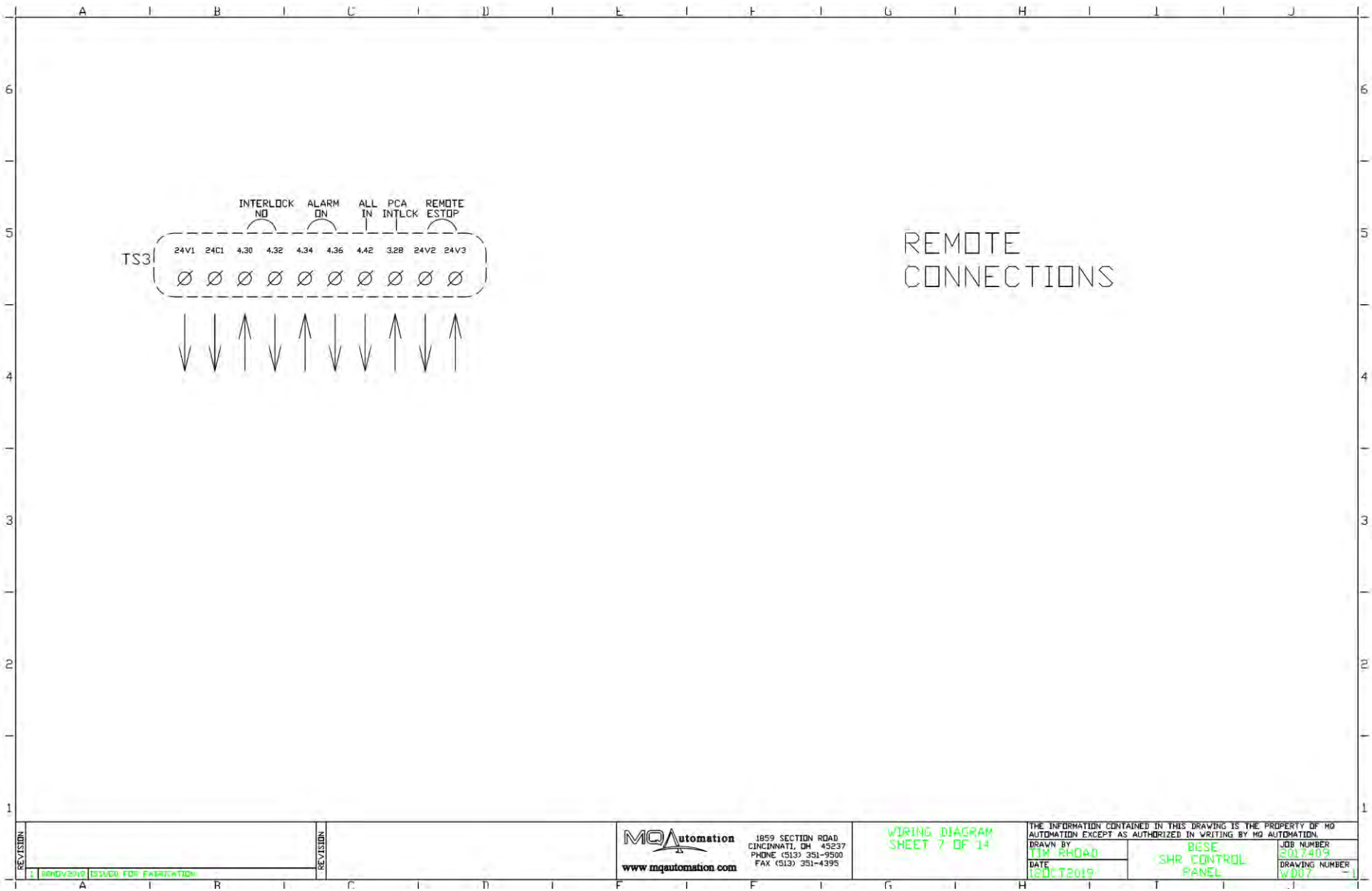
SHR CONTROL
PANEL
JOB NUMBER
2017409
DRAWING NUMBER
WD06 -1


INTERLOCK NO
ALARM ON
ALL IN
PCA INTLCK
REMOTE ESTOP
TS3
24V1 24C1 4.30 4.32 4.34 4.36 4.42 3.28 24V2 24V3
REMOTE CONNECTIONS
REVISION
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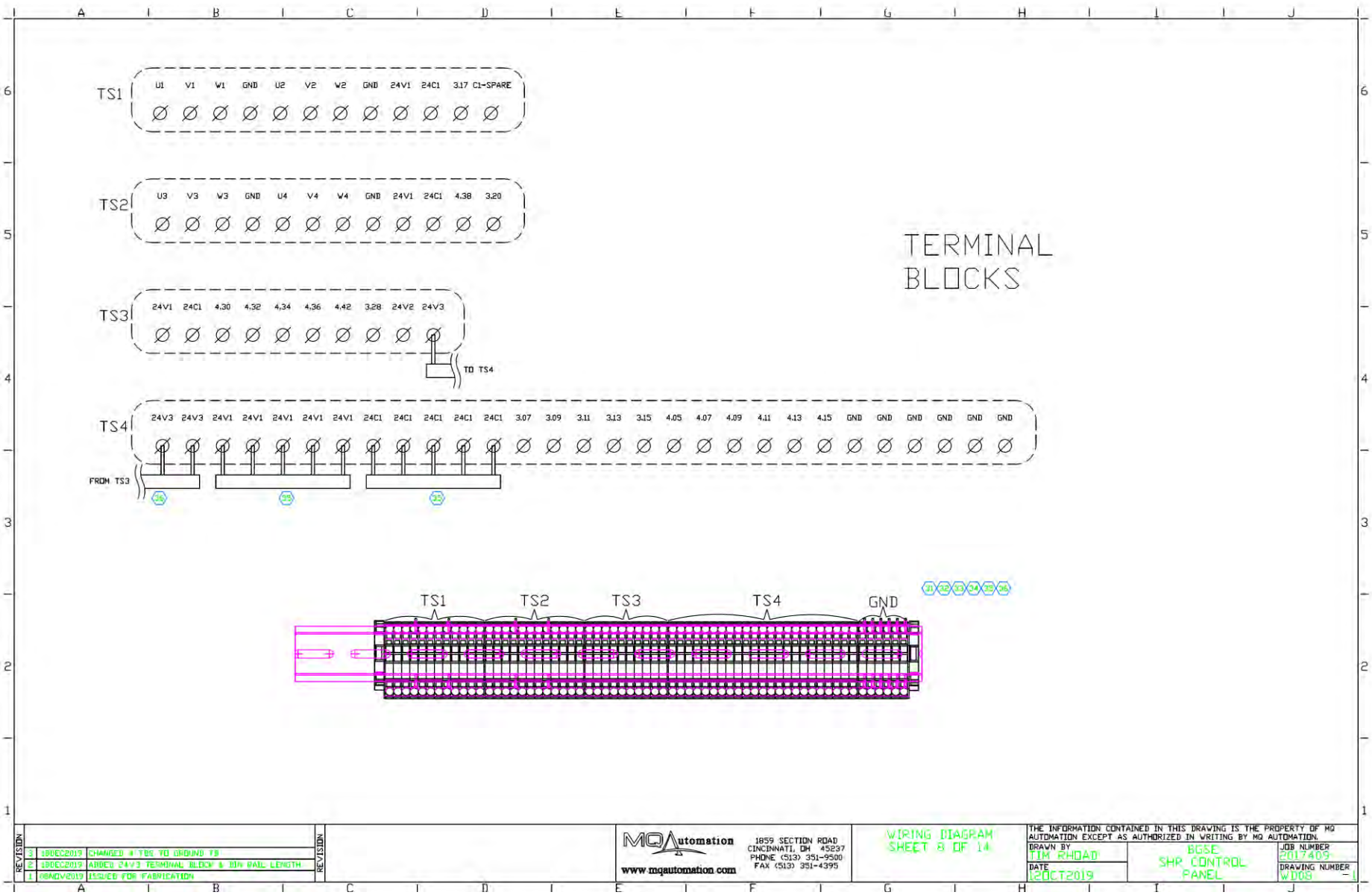
BGSE SHR CONTROL PANEL
JOB NUMBER 2017409
DRAWING NUMBER WD07 -1


TS1
U1 V1 W1 GND U2 V2 W2 GND 24V1 24C1 3.17 C1-SPARE
TS2
U3 V3 W3 GND U4 V4 W4 GND 24V1 24C1 4.38 3.20
TS3
24V1 24C1 4.30 4.32 4.34 4.36 4.42 3.28 24V2 24V3
TO TS4
TS4
24V3 24V3 24V1 24V1 24V1 24V1 24V1 24C1 24C1 24C1 24C1 24C1 3.07 3.09 3.11 3.13 3.15 4.05 4.07 4.09 4.11 4.13 4.15 GND GND GND GND GND GND
FROM TS3
TERMINAL BLOCKS
TS1
TS2
TS3
TS4
GND
REVISION
3 18DEC2019 CHANGED # TBS TO GROUND TB
2 18DEC2019 ADDED 24V3 TERMINAL BLOCK & DIN RAIL LENGTH
1 08NOV2019 ISSUED FOR FABRICATION
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SHEET 8 OF 14
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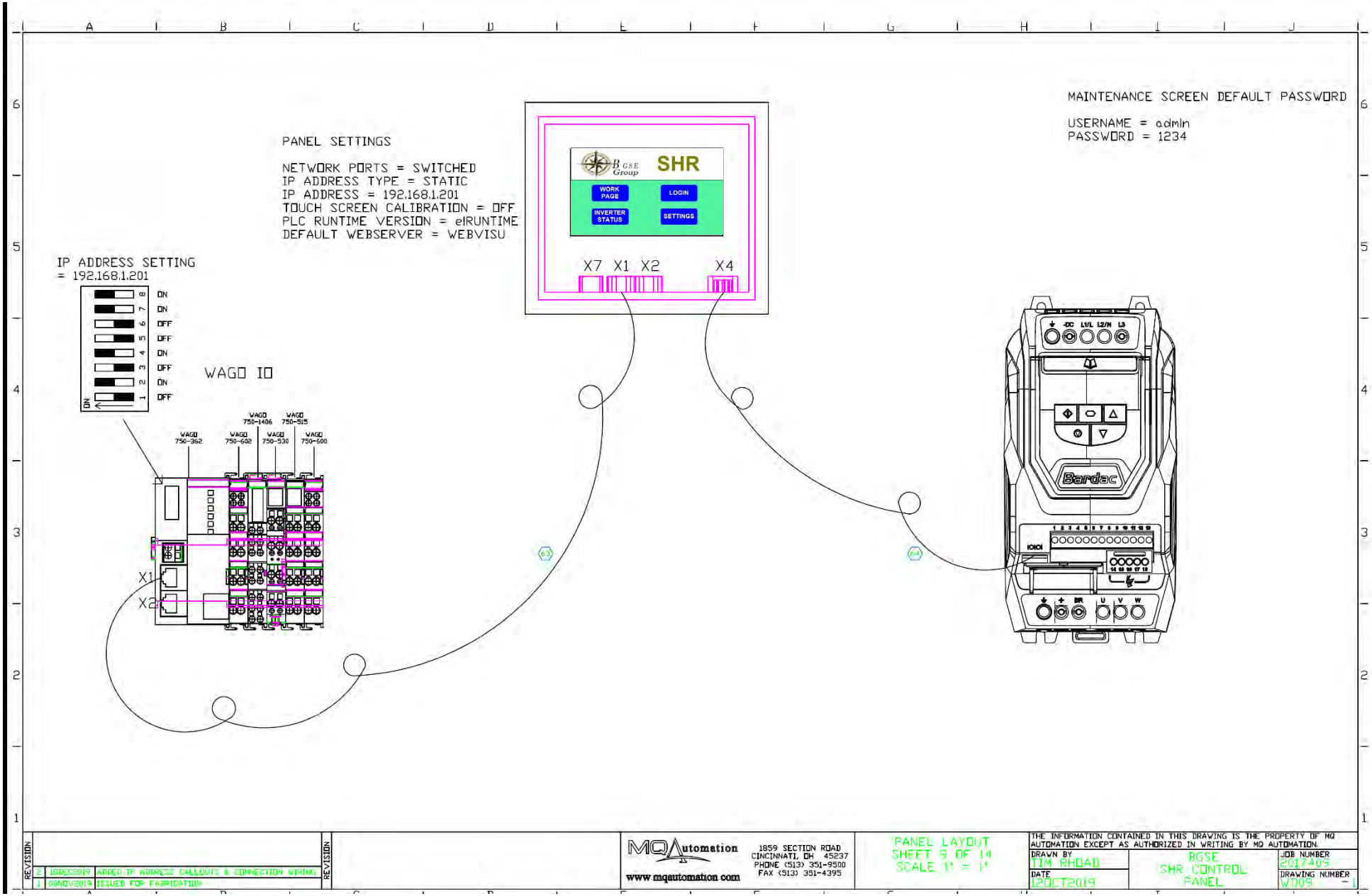
DRAWN BY TIM RHOAD
DATE 12OCT2019
BGSE SHP CONTROL PANEL
JOB NUMBER 2017409
DRAWING NUMBER wD08


PANEL SETTINGS
NETWORK PORTS = SWITCHED
IP ADDRESS TYPE = STATIC
IP ADDRESS = 192.168.1.201
TOUCH SCREEN CALIBRATION = OFF
PLC RUNTIME VERSION = eIRUNTIME
DEFAULT WEBSERVER = WEBVISU
MAINTENANCE SCREEN DEFAULT PASSWORD
USERNAME = admin
PASSWORD = 1234
IP ADDRESS SETTING
= 192.168.1.201
WAGO IO
SHR
WORK PAGE
LOGIN
INVERTER STATUS
SETTINGS
X7 X1 X2
X4
Bardac
PANEL LAYOUT
SHEET 9 OF 14
SCALE 1" = 1"
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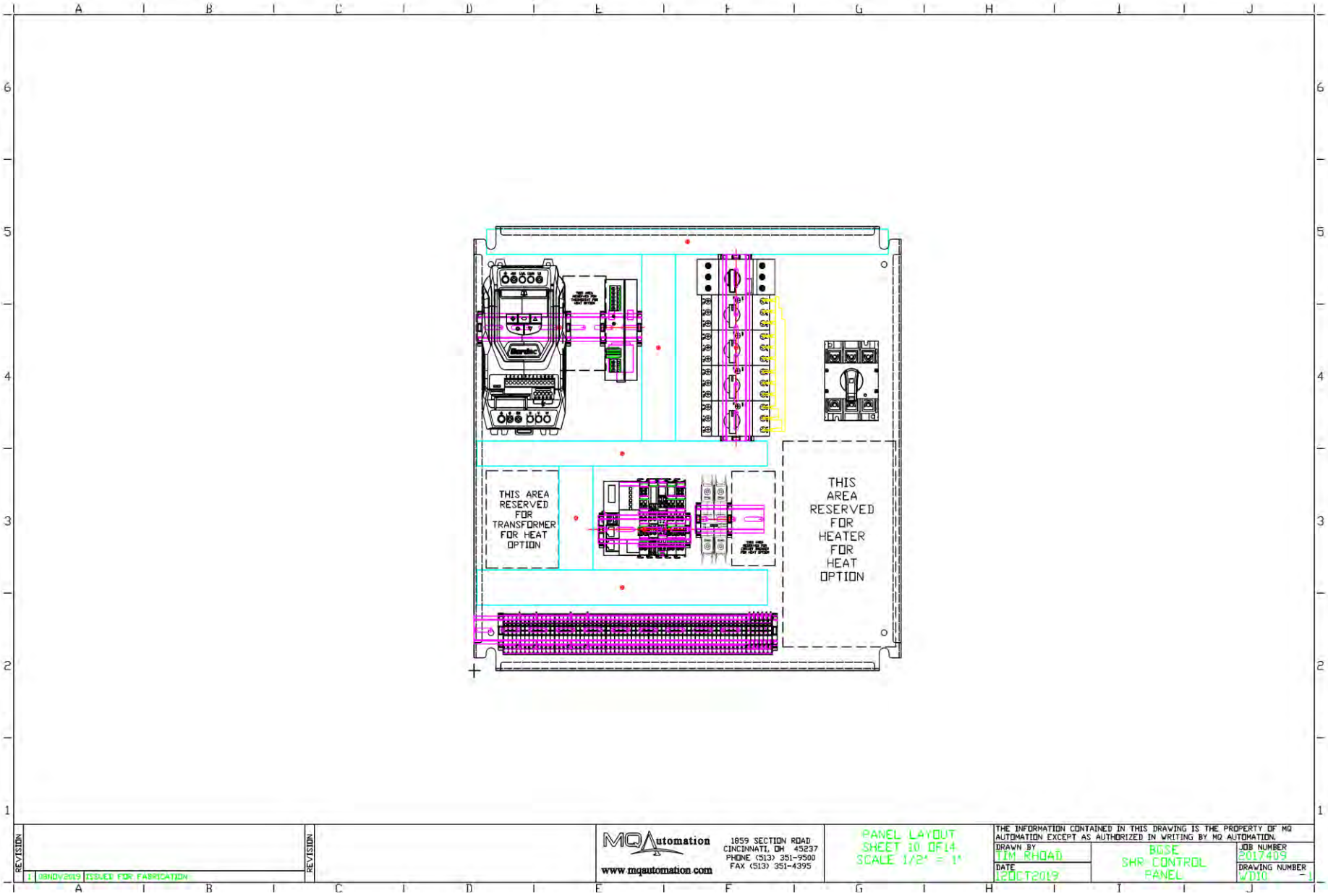
SHR CONTROL
PANEL
DRAWN BY
TIM RHOAD
DATE
12OCT2019
JOB NUMBER
2017409
DRAWING NUMBER
W009


THIS AREA RESERVED FOR TRANSFORMER FOR HEAT OPTION
THIS AREA RESERVED FOR HEATER FOR HEAT OPTION
REVISION
1 08NOV2019 ISSUED FOR FABRICATION
REVISION
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PANEL LAYOUT
SHEET 10 OF14
SCALE 1/2" = 1"
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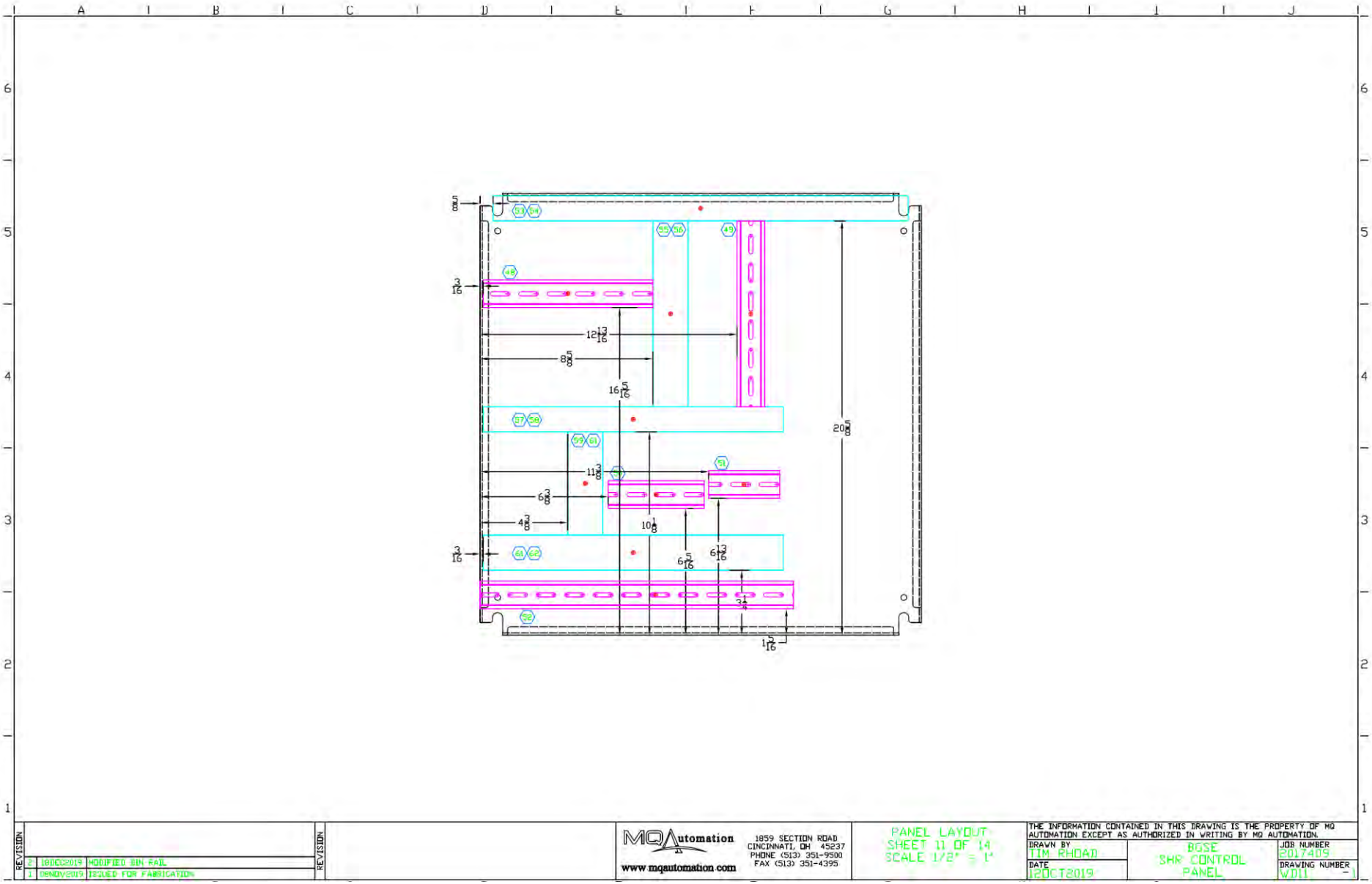
PANEL
JOB NUMBER
2017409
DRAWING NUMBER
WD10 - 1


A
B
C
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F
G
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J
1
2
3
4
5
6
REVISION
2 18DEC2019 MODIFIED BIN RAIL
1 08NOV2019 ISSUED FOR FABRICATION
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SHEET 11 OF 14
SCALE 1/2" = 1"
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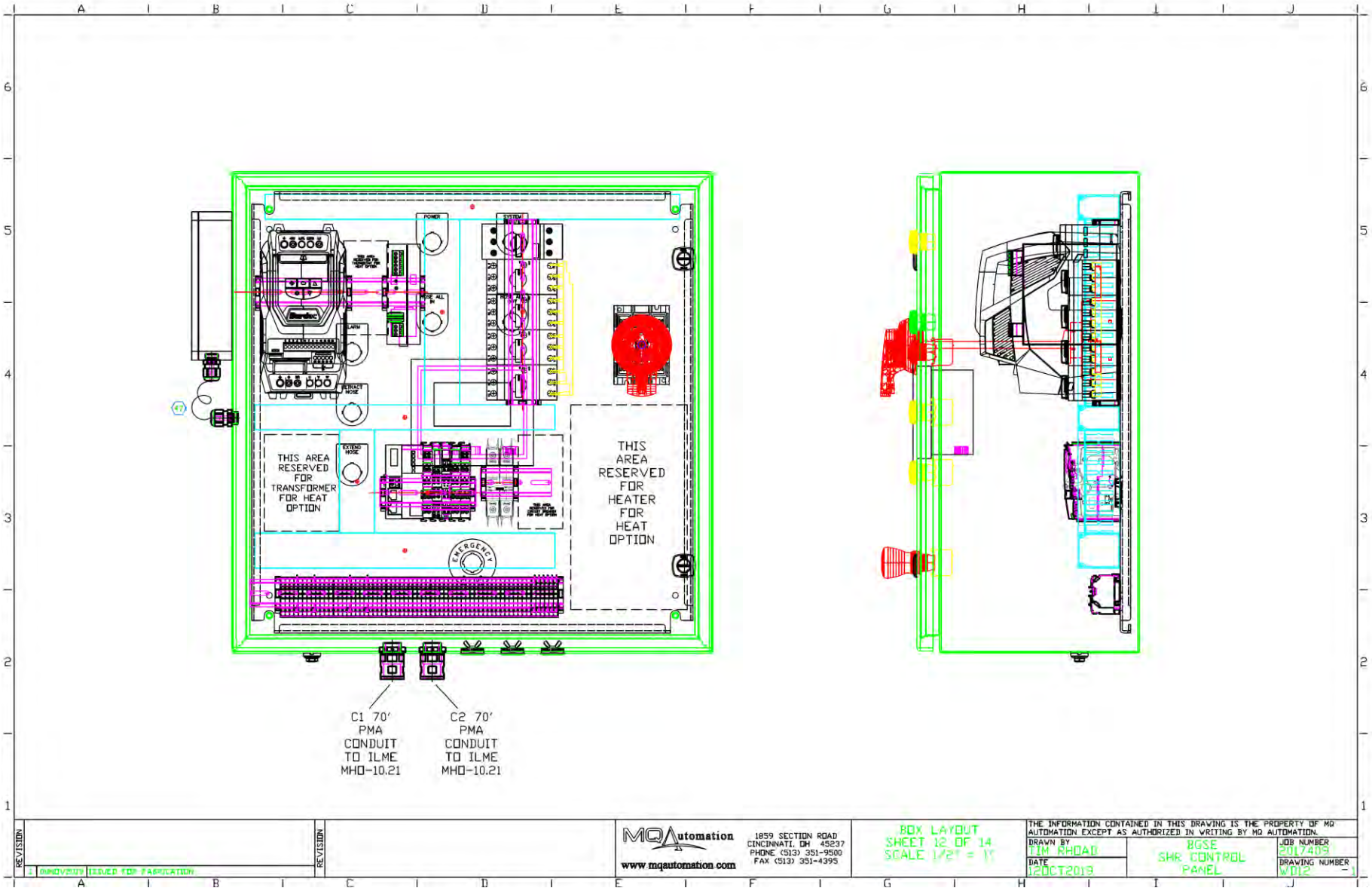
SHR CONTROL
PANEL
JOB NUMBER
2017409
DRAWING NUMBER
WD11 - 1


THIS AREA RESERVED FOR TRANSFORMER FOR HEAT OPTION
THIS AREA RESERVED FOR HEATER FOR HEAT OPTION
C1 70' PMA CONDUIT TO ILME MH0-10.21
C2 70' PMA CONDUIT TO ILME MH0-10.21
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BOX LAYOUT
SHEET 12 OF 14
SCALE 1/2" = 1'
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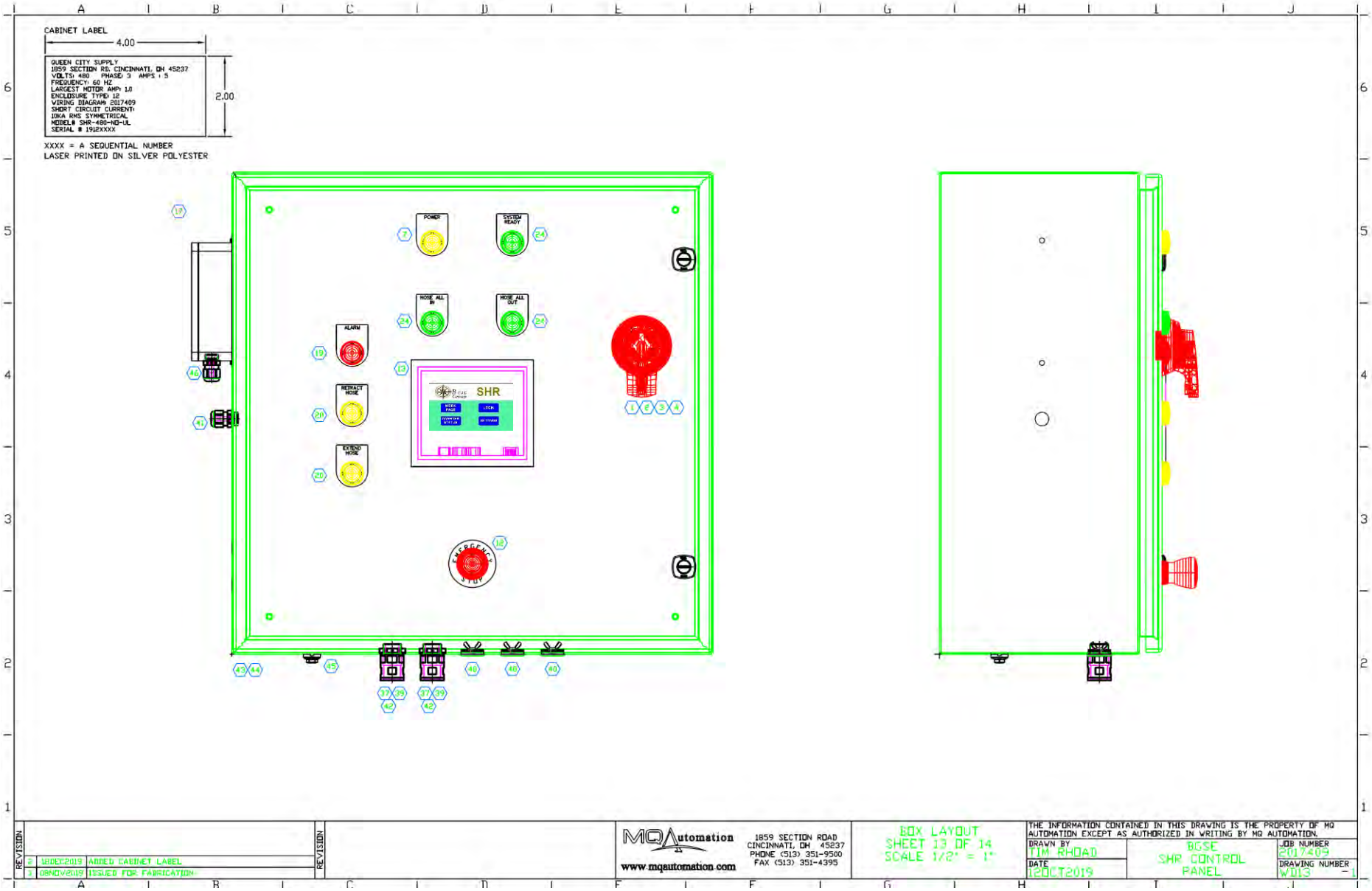
DRAWN BY: TIM RHOAD
DATE: 12OCT2019
BGSE SHR CONTROL PANEL
JOB NUMBER 2017409
DRAWING NUMBER WD12 -1


CABINET LABEL
4.00
2.00
QUEEN CITY SUPPLY
1859 SECTION RD. CINCINNATI, OH 45237
VOLTS: 480 PHASE: 3 AMPS : 5
FREQUENCY: 60 HZ
LARGEST MOTOR AMP: 1.0
ENCLOSURE TYPE: 12
WIRING DIAGRAM 2017409
SHORT CIRCUIT CURRENT:
10KA RMS SYMMETRICAL
MODEL# SHR-480-NO-UL
SERIAL # 1912XXXX
XXXX = A SEQUENTIAL NUMBER
LASER PRINTED ON SILVER POLYESTER
POWER
SYSTEM READY
HOSE ALL IN
HOSE ALL OUT
ALARM
RETRACT HOSE
EXTEND HOSE
SHR
EMERGENCY STOP
REVISION
2 12DEC2019 ADDED CABINET LABEL
1 08NOV2019 ISSUED FOR FABRICATION
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SHEET 13 OF 14
SCALE 1/2" = 1"
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DRAWN BY
TIM RHOAD
DATE
12OCT2019
BGSE
SHR CONTROL
PANEL
JOB NUMBER
2017409
DRAWING NUMBER
WD13 - 1

BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION	BOM ITEM	QTY	MANUFACTURER	CAT. NUMBER	DESCRIPTION
1	1	LOVATO	GA063A	MAIN DISCONNECT	31	53	WAGO	2002-1201	GREY TERMINAL BLOCK	61	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 15"
2	1	LOVATO	GAX66N	DISCONNECT HANDLE	32	5	WAGO	2002-1291	END BARRIER	62	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 15"
3	1	LOVATO	GAX7300AN	DISCONNECT SHAFT	33	14	WAGO	249-116	END CLAMP	63	1	MONOPRICE	9871	7' ETHERNET CABLE BLUE
4	1	LOVATO	GAX60B	ADAPTER FOR PISTOL GRIP	34	10	WAGO	2002-1207	GROUND TERMINAL BLOCK	64	1	MQ-CUSTOM	MQ-CAN121901	DB9-RJ45 CANopen CABLE
5	1	SPRECHER & SCHUH	L9-2/2/C	CIRCUIT BREAKER	35	2	WAGO	2002-405	5 POSITION JUMPER	65				
6	1	WAGO	787-1628	POWER SUPPLY	36	1	WAGO	2002-403	3 POSITION JUMPER	66				
7	1	SPRECHER & SCHUH	D7P-P7PN3W	AMBER PILOT LIGHT	37	6	IGUS	I-BVND-M207GT	21.2MM OD CONNECTOR M20	67				
8	1	SPRECHER & SCHUH	KTU7-D-3D-10	MOTOR DISCONNECT	38	140	IGUS	I-CYLT-17B	PMA PLASTIC CONDUIT	68				
9	1	BARDAC	P2-24020-3HF42	VFD 2 HP WITH STO	39	2	MENCOM	2M20PA/SW	M20 PLASTIC NUT	69				
10	4	SPRECHER & SCHUH	KTA7-25S-1.6A	MOTOR OVERLOAD	40	3	SAGINAW ELEC	SCE-ASPBG-SS	.875 SS HOLE FILLER	70				
11	1	SPRECHER & SCHUH	KT7-32-DB-45-4	OVERLOAD BUSBAR	41	1	MENCOM	PCG-11-B	PG11 CORD GRIP & NUT	71				
12	1	SPRECHER & SCHUH	D7P-MT44PX02	E-STOP TWIST TO RELEASE	42	4	MENCOM	316G	PG16 "O" RING	72				
13	1	WAGO	762-4301/8000-002	4.3" WEB PANEL	43	1	EXM	5412ESSP242410	24x24x10 SS ENCLOSURE	73				
14	1	WAGO	750-602	POWER FEED MODULE	44	1	EXM	881 SP2424	24x24 SUB PANEL	74				
15	1	WAGO	750-362	MODBUS BUS COUPLER	45	1	EXM	880-BD1	ENCLOSURE DRAIN	75				
16	1	WAGO	750-600	END MODULE	46	1	MENCOM	PCG-16R-B	PG16 CORD GRIP & NUT	76				
17	1	REMDEVICE	T3-ECO-915	REMOTE CONTROLRECEIVER	47	1	BELDEN	8465	4 FEET OF 8465 CABLE	77				
18	1	WAGO	750-1406	16PT INPUT MODULE	48	1	WAGO	210-112	35MM DIN RAIL 8-1/2"	78				
19		SPRECHER & SCHUH	D7P-LF4PN3RX10	RED LIGHTED PB	49	1	WAGO	210-112	35MM DIN RAIL 9-1/4"	79				
20	2	SPRECHER & SCHUH	D7P-LF5PN3WX10	YELLOW LIGHTED PB	50	1	WAGO	210-112	35MM DIN RAIL 4-3/4"	80				
21					51	1	WAGO	210-112	35MM DIN RAIL 3-1/2"	81				
28	1	SPRECHER & SCHUH	KT7-PE1-10	MOTOR OL AUX CONTACT	52	1	WAGO	210-112	35MM DIN RAIL 15-5/8"	82				
23	1	WAGO	750-530	8PT OUTPUT CARD	53	1	PANDUIT	F1X3LG6	1"x3" WIRE DUCT 20-3/4"	83				
24	3	SPRECHER & SCHUH	D7P-P3PN3G	GREEN PILOT LIGHT	54	1	PANDUIT	C1LG6	1" DUCT COVER 20-3/4"	84				
25					55	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 9-1/4"	85				
26	1	WAGO	750-515	4PT RELAY OUTPUT CARD	56	1	PANDUIT	C1.5LG6	1" DUCT COVER 9-1/4"	86				
27	1	ILME	MHD-10.21	10 PIN CONNECTOR HOOD	57	1	PANDUIT	F1X3LG6	1"x3" WIRE DUCT 15"	87				
28	1	ILME	CNEF-10T	10 PIN FEMALE CONNECTOR	58	1	PANDUIT	C1LG6	1" DUCT COVER 15"	88				
29	1	ILME	CHP-10	10 PIN DOUBLE LATCH BASE	59	1	PANDUIT	F1.5X3LG6	1.5"x3" WIRE DUCT 5-1/8"	89				
30	1	ILME	CNEM-10T	10 PIN MALE CONNECTOR	60	1	PANDUIT	C1.5LG6	1.5" DUCT COVER 5-1/8"	90				

REVISION		
2	18DEC2019	UPDATED PER ABOVE CHANGES
1	08NOV2019	ISSUED FOR FABRICATION

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BOM
SHEET 14 OF 14

DRAWN BY		JOB NUMBER
TIM RHOAD	BGSE SHR CONTROL PANEL	2017409
DATE		DRAWING NUMBER
12OCT2019		WD14 -1

ANNEX #1

VFD ERROR CODES AND TROUBLESHOOTING GUIDE

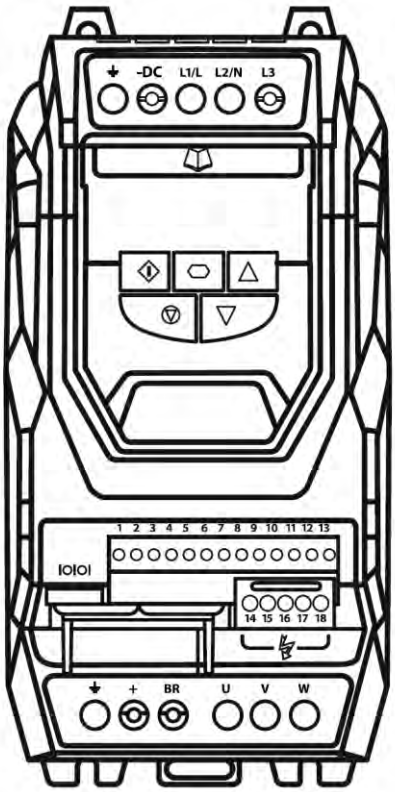
User Guide

Bardac drives

P2 Series

AC Vector Drive

For Precision Industrial Motor Speed & Torque Control



Troubleshooting

Fault Messages

Fault Code	No.	OLED Message Description	Corrective Action
no-FLt	00	No Fault	Displayed in P0-13 if no faults are recorded in the log.
OI-b	01	Brake channel over current	Ensure the connected brake resistor is above the minimum permissible level for the drive – refer to the ratings shown in section 10.2. Input/Output Power and Current Ratings. Check the brake resistor and wiring for possible short circuits.
OL-br	02	Brake resistor overload	The drive software has determined that the brake resistor is overloaded, and trips to protect the resistor. Always ensure the brake resistor is being operated within its designed parameter before making any parameter or system changes. To reduce the load on the resistor, increase deceleration the time, reduce the load inertia or add further brake resistors in parallel, observing the minimum resistance value for the drive in use.
O-I	03	Over current trip	**Fault Occurs on Drive Enable** Check the motor and motor connection cable for phase – phase and phase – earth short circuits. Check the load mechanically for a jam, blockage or stalled condition. Ensure the motor nameplate parameters are correctly entered, P1-07, P1-08, P1-09. If operating in Vector mode (P4-01 – 0 or 1), also check the motor power factor in P4-05 and ensure an autotune has been successfully completed for the connected motor. Reduced the Boost voltage setting in P1-11. Increase the ramp up time in P1-03. If the connected motor has a holding brake, ensure the brake is correctly connected and controlled, and is releasing correctly. **Fault Occurs When Running** If operating in Vector mode (P4-01 – 0 or 1), reduce the speed loop gain in P4-03.
It-trP	04	Drive has tripped on overload after delivering >100% of value in P1-08 for a period of time.	Check to see when the decimal points are flashing (drive in overload) and either increase acceleration rate or reduce the load. Check motor cable length is within the limit specified for the relevant drive in section 10.2. Ensure the motor nameplate parameters are correctly entered in P1-07, P1-08, and P1-09. If operating in Vector mode (P4-01 – 0 or 1), also check the motor power factor in P4-05 and ensure an autotune has been successfully completed for the connected motor. Check the load mechanically to ensure it is free, and that no jams, blockages or other mechanical faults exist.
PS-trP	05	Hardware Over Current	Check the wiring to motor and the motor for phase to phase and phase to earth short circuits. Disconnect the motor and motor cable and retest. If the drive trips with no motor connected, it must be replaced and the system fully checked and retested before a replacement unit is installed.
O-uoLt	06	Over voltage on DC bus	The value of the DC Bus Voltage can be displayed in P0-20. A historical log is stored at 256ms intervals prior to a trip in parameter P0-36. This fault is generally caused by excessive regenerative energy being transferred from the load back to the drive. When a high inertia or over hauling type load is connected. If the fault occurs on stopping or during deceleration, increase the deceleration ramp time P1-04 or connect a suitable brake resistor to the drive. If operating in Vector Mode, reduce the speed loop gain P4-03. If operating in PID control, ensure that ramps are active by reducing P3-11.
U-uoLt	07	Under voltage on DC bus	This occurs routinely when power is switched off. If it occurs during running, check the incoming supply voltage, and all connections into the drive, fuses, contactors etc.
O-t	08	Heatsink over temperature	The heatsink temperature can be displayed in P0-21. A historical log is stored at 30 second intervals prior to a trip in parameter P0-38. Check the drive ambient temperature. Ensure the drive internal cooling fan is operating. Ensure that the required space around the drive as shown in sections 3.5. Mechanical Dimensions and Weight to 3.9. Guidelines for Mounting (IP66 Units) has been observed, and that the cooling airflow path to and from the drive is not restricted. Reduce the effective switching frequency setting in parameter P2-24. Reduce the load on the motor / drive.
U-t	09	Under temperature	Trip occurs when ambient temperature is less than -10°C. The temperature must be raised over -10°C in order to start the drive.
P-dEF	10	Factory Default parameters have been loaded	Press STOP key, the drive is now ready to be configured for the required application.
E-trIP	11	External trip	E-trip requested on control input terminals. Some settings of P1-13 require a normally closed contact to provide an external means of tripping the drive in the event that an external device develops a fault. If a motor thermistor is connected check if the motor is too hot.

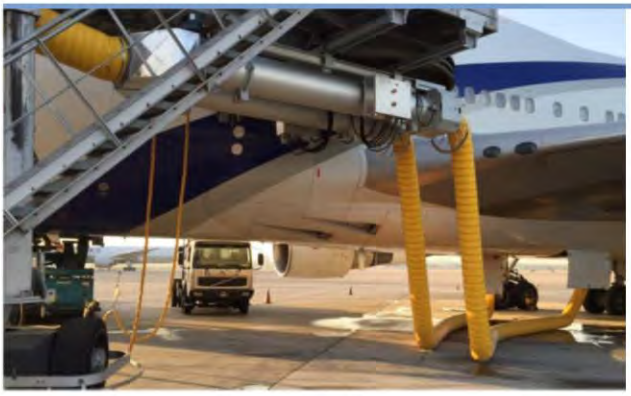
Fault Code	No.	OLED Message Description	Corrective Action
SC-Obs	12	Communications Fault	Communications lost with PC or remote keypad. Check the cables and connections to external devices.
FLt-dc	13	Excessive DC ripple	The DC Bus Ripple Voltage level can be displayed in parameter P0-16. A historical log is stored at 20ms intervals prior to a trip in parameter P0-37. Check all three supply phases are present and within the 3% supply voltage level imbalance tolerance. Reduce the motor load. If the fault persists, contact your local Bardac Sales Partner.
P-LoSS	14	Input phase loss	Drive intended for use with a 3 phase supply, one input phase has been disconnected or lost.
h O-I	15	Instantaneous over current on drive output	Refer to fault 3 above.
th-FLt	16	Faulty thermistor on heatsink	Refer to your Bardac Sales Partner.
dAtA-F	17	Internal memory fault	Parameters not saved, defaults reloaded. Try again. If problem recurs, refer to your Bardac Authorised Distributor.
4-20F	18	4-20mA Signal Lost	The reference signal on Analog Input 1 or 2 (Terminals 6 or 10) has dropped below the minimum threshold of 3mA. Check the signal source and wiring to the drive terminals.
dAtA-E	19	Internal memory fault	Parameters not saved, defaults reloaded. Try again. If problem recurs, refer to your Bardac Authorised Distributor.
U-dEF	20	User Parameter Default	User Parameter defaults have been loaded. Press the Stop key.
F-Ptc	21	Motor PTC Over Temperature	The connected motor PTC device has caused the drive to trip.
FAn-F	22	Cooling Fan Fault	Check and if necessary, replace the drive internal cooling fan.
O-hEAt	23	Ambient Temperature High	The measured temperature around the drive is above the operating limit of the drive. Ensure the drive internal cooling fan is operating. Ensure that the required space around the drive as shown in sections 3.5. Mechanical Dimensions and Weight to 3.9. Guidelines for Mounting (IP66 Units) has been observed, and that the cooling airflow path to and from the drive is not restricted. Increase the cooling airflow to the drive. Reduce the effective switching frequency setting in parameter P2-24. Reduce the load on the motor / drive.
O-torq	24	Maximum Torque Limit Exceeded	The output torque limit has exceeded the drive capacity or trip threshold. Reduce the motor load, or increase the acceleration time.
U-torq	25	Output Torque Too Low	Active only when hoist brake control is enabled P2-18 = 8. The torque developed prior to releasing the motor holding brake is below the preset threshold. Contact your local Bardac Sales Partner for further information on using the P2 drive in hoist applications.
OUt-F	26	Drive output fault	Drive output fault.
Sto-F	29	Internal STO circuit Error	Refer to your Bardac Sales Partner.
Enc-01	30	Encoder Feedback Fault	Encoder communication /data loss.
SP-Err	31	Speed Error	Speed Error. The error between the measured encoder feedback speed or the estimated rotor speed is greater than the pre-set limit allowed.
Enc-03	32	Encoder Feedback Fault	Incorrect Encoder PPR count set in parameters.
Enc-04	33	Encoder Feedback Fault	Encoder Channel A Fault.
Enc-05	34	Encoder Feedback Fault	Encoder Channel B Fault.
Enc-06	35	Encoder Feedback Fault	Encoder Channels A & B Fault.
AtF-01	40	Autotune Failed	Measured motor stator resistance varies between phases. Ensure the motor is correctly connected and free from faults. Check the windings for correct resistance and balance.
AtF-02	41		Measured motor stator resistance is too large. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
AtF-03	42		Measured motor inductance is too low. Ensure the motor is correctly connected and free from faults.
AtF-04	43		Measured motor inductance is too large. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
AtF-05	44		Measured motor parameters are not convergent. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
Ph-SEQ	45	Incorrect Supply Phase Sequence	Applies to Frame Size 8 drives only, indicates that the incoming power supply phase sequence is incorrect. Any 2 phases may be swapped.

Fault Code	No.	OLED Message Description	Corrective Action
OUt-Ph	49	Output Phase Loss	One of the motor output phases is not connected to the drive.
Sc-F01	50	Modbus Comms fault	A valid Modbus telegram has not been received within the watchdog time limit set in P5-06. Check the network master / PLC is still operating. Check the connection cables. Increase the value of P5-05 to a suitable level.
Sc-F02	51	CAN Open comms trip	A valid CAN open telegram has not been received within the watchdog time limit set in P5-06. Check the network master / PLC is still operating. Check the connection cables. Increase the value of P5-06 to a suitable level.
Sc-F03	52	Communications Option Module Fault	Internal communication to the inserted Communication Option Module has been lost. Check the module is correctly inserted.
Sc-F04	53	IO card comms trip	Internal communication to the inserted Option Module has been lost. Check the module is correctly inserted.

PCAir Hose Retriever

ANNEX #2

The most advanced and innovative PCA hose retriever on the market. Design integrity and field experience has resulted in hundreds of units in service worldwide.



- **Extract only the length needed**
- **No mechanical transmission**
- **Low air pressure losses**
- **Compact size mounted close to aircraft connection**

EXCLUSIVE FEATURES:

- ❑ Four inverter-driven motors/belts for smooth extraction and retraction without chains, gears, or rotating shafts. Strap pressure is adjustable to maximize performance in every operating set-up and environment.
- ❑ Anodized aluminum tube offers maximum corrosion resistance and an attractive aesthetic look.
- ❑ Control panel (stainless steel, protection degree IP 65), installed at ramp level, PLC maintenance display on the access door.
- ❑ Quick-release connectors to facilitate disconnection of the head or electrical panel.
- ❑ Horizontal sliding drive head to allow rapid replacement of the air delivery pipe.
- ❑ Long operating life of the air delivery hose - verified in the field to two years of operation minimum.

PCAir Hose Retriever

Features

Control Panel

The control panel is installed at the ramp level and contains the fixed control devices. The connections to the gearmotors and to the limit switches are made with quick-release connectors, which allow rapid disconnection of the electrical panel and the drive head. The inverter controls the gearmotor, the extension and retraction speed of the pipe, and the intervention of the overload protection. The functionality of the hose collector is managed by a Schneider Electric PLC.

Wireless control:

The radio control transmitter, located on the aircraft adapter, contains the extraction and retraction controls of the hose. The receiver is installed outside the electrical panel. The radio control system operates at a civil frequency of 870 MHz, and at start-up, a single communication channel is established between transmitter and receiver, preventing interference and allowing the simultaneous operation of PCAir Hose Retriever.

Limit switches

A proximity sensor stops the fully extended hose. A pair of photocell limit switches stop the totally retracted piping.

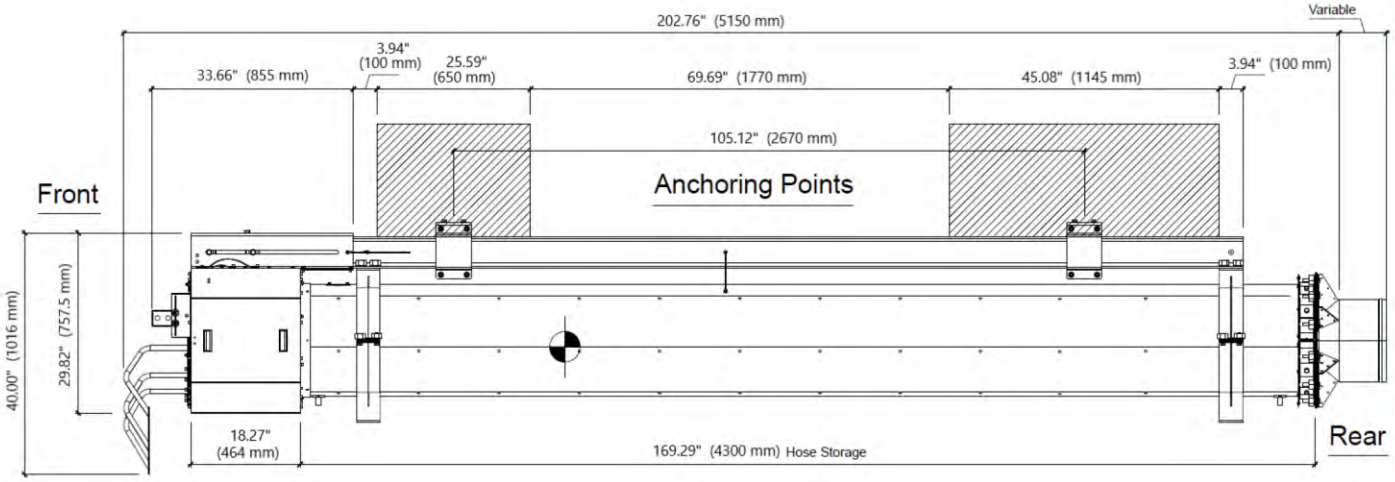
Air delivery Hose/ Aircraft adapter

The flexible hose is fabric, coated in yellow PVC, with an internal insulating layer. The hose sections are joined at both ends by a zipper and a protective Velcro band. The BGSE COOL JET® hose retriever is equipped with 68 ft or 91 ft (21 m or 28 m) of hose, with final conical reduction to 8 inch (200mm) internal diameter. Different lengths are available on request. The first length of hose is fixed on a collar by means of a band clamp.

PCAir Hose Retriever

Technical Specifications

- Power supply: 3 x 480V + 60Hz 6A (other options available)
- Control panel: IP 65 in AISI 304 stainless steel
- PLC Schneider control with display on the front door panel
- Tension Motors powered by inverter
- Limit switch for full extension and retraction
- Dock movement interlock
- PCA ON interlock
- Extension / retraction speed: Variable up to a maximum of 25 m / min
- Maximum pressure drop with flow rate 150 Kg / min: 1,200 Pa
- Temperature loss with full extension pipe: 2°C at 35°C 50% UR
- Safety interlock on the panel door
- Protection against overload (inverter)
- REM Device T3 radio control panel on the aircraft adapter (other options available)
- Ion lithium battery, min. operating life 1000 h
- Sound and light movement alert (option)
- Operating temperature: from -20 to + 60°C
- Noise below 60 dBA Reference standard:
- Machinery Directive 2006/42 / EC Low Directive Voltage 2006/95 / EC Electromagnetic compatibility Electromagnetic Directive 2004/108 / EC Radio and Telecommunications Directive 99/5 / EC Air delivery hose:
- Intertek Field Labeling Product Certifications
- Double layer of 1100 dtex polyester coated PVC, yellow, 2 mm (5 mm optional) of internal insulation, reinforced with galvanized steel spiral, 5 mm
- Tensile strength: 2700 N / 5cm (ISO 142/1)
- Thermal conductivity: 0.06 W / m ° K (with 2 mm insulation)
- Fire retardant characteristics: M2 / B1 / BS / B-s2-d0 / NFPA 70
- Working pressure: 48 Inch WG 12,000 Pa
- Test pressure: 80 Inch WG (20,000 Pa)
- Aircraft adapter: 360° swivel or equivalent
- Weight: 1,000 Lbs. (500 kg) with 91 Ft (28 m) hose



BGSE Group
14034 Clarendon Point Court
Huntersville, NC 28078
United States of America

ANNEX #3
Manufacturer's Warranty

Field Service and Warranty

Please contact

Field Service Manager:

John F Runyan

Service Manager

BGSE Group

(316) 880-7588

Limited Product Warranty

A. BGSE Group, ("SELLER") warrants that products when shipped and work when performed are (1) free from defects in material and workmanship, (2) conform to all design and manufacturing requirements contained in the contract, and (3) meet or exceed the performance requirements specified in the contract. All claims under this warranty must be made in writing immediately upon discovery and in any event within one (1) year from acceptance, owners beneficial use of the product or from completion of the applicable work if work is involved, whichever is earlier. Any product repaired or provided, as a replacement hereunder shall be warranted for the remainder of the applicable warranty period. Defective and nonconforming items must be held for SELLER's inspection and promptly returned to the original f.o.b. point upon request.
THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED, AND STATUTORY, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

B. Upon SELLER's inspection and confirmation of the claimed non-conformity, and provided that the product has not been subjected to misuse, or repair or alteration not performed or authorized by SELLER, or damaged by neglect, accident or improper installation (by someone other than Seller), and further that BUYER has performed all required service and preventive maintenance on the product in accordance with SELLER's maintenance manual and can demonstrate such performance through maintenance records, the SELLER shall at its option either (1) provide replacement parts for its product at the final delivery point, or (2) refund an equitable portion of the purchase price.

C. SELLER's obligation hereunder is expressly limited to replacement or an agreed adjustment in price, and in lieu of any other obligation or responsibility for damages.
IN NO EVENT SHALL SELLER BE RESPONSIBLE FOR INCIDENTAL, SPECIAL, CONSEQUENTIAL OR ANY OTHER INDIRECT DAMAGES HEREUNDER. THE FOREGOING STATES SELLER'S ENTIRE LIABILITY AND BUYER'S EXCLUSIV AND SOLE REMEDY UNDER THIS WARRANTY. Any action by BUYER arising hereunder, or relating hereto whether based on breach of contract, tort (including negligence and strict liability) or other theories must be discovered within the warranty period or it shall be barred.

D. Failure caused by: (a) BUYER's abuse and (b) acts of God, which shall include but not be limited to hurricanes, earthquakes, and natural disasters, are specifically excluded from the coverage of this warranty.

E. SELLER disclaims any warranty responsibility in the event of any modification of it product without prior written consent of SELLER.

F. The foregoing warranty provisions are applicable only if the BUYER has performed preventative maintenance in accordance with SELLER's maintenance manual. The required maintenance must be performed and records maintained for SELLER's review and inspection if requested.

G. Due to the inherent design and operational use of the aircraft supply hose, supply cable hose storage basket, cable hoist, cable reel light lenses and fuses, they are considered expendable parts and are not covered by any warranty other than that of workmanship and quality.

H. Non-Assignability--This warranty extends only to the original BUYER of each product and is not assignable to any other entity without the prior written approval of SELLER.

I. No agreement or understanding bearing upon or extending the warranty or remedies set forth herein will be binding upon SELLER unless SELLER has agreed thereto in writing.