EQMet

iDAS
User Manual

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Warranty

We warrant each new EQMet product for a period of one year from date of shipment. Defects in material or workmanship found within that period will be replaced or repaired (at our option) without charge for materials or labor. Before returning any product to EQMet please request an RMA number through EQMet Technical Support and make reference to this number in any following correspondence. Once the warranty return of a product is authorized we will pay the round trip freight charges to the factory for repair under warranty. If subsequent evaluation establishes that necessary repairs are due to misuse, then the customer must assume all charges.

Insurance for all shipments, either first sale or repair, is the responsibility of the customer.

Other Equipment Manufacturers (OEM) included in systems (e.g. peripherals, options) are warranted for 90 days from date of shipment.

OEM components may be warranted by the original equipment manufacturer.

OEM Software may carry its own warranty and the customer should sign any appropriate license agreement(s) and return to software manufacturer. No responsibility is assumed for such third-party software.

Software and software updates provided for EQMet products have a warranty period of one year. An update shipped under warranty will be covered by the original system's warranty for the balance of the one year period.

Warranty claims shall be made on Software Change Request forms (SCRs). Problems reported by filing an SCR within one year will be corrected free of charge. SCRs filed after the one year period will be billed at the then-current rates.

Software corrections may be supplied via a software patch, or by shipping updated software.

Shipment of updated software will sometimes require hardware or configuration changes to the system. Hardware changes may include, but are not limited to, memory and disk drives. Required hardware or configuration changes are not included in the cost of a software update, and may represent an additional cost to the customer.

Requests for Technical Support

All Technical Support questions should be directed via email to EQMet Technical Support at the address below. This includes any hardware or software questions. The website and this manual contain information required to support the vast majority of applications. Please note that phone support is not provided for EQMet products.

Technical Support: **support@eqmet.com**
Website: www.eqmet.com

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Safety

These symbols may appear on EQMet equipment or in this manual:

When you see this symbol, *pay careful attention.* Refer to the similarly marked, relevant part of this manual before servicing the instrument.

This symbol means a *low-noise earth ground*. The noted item should be grounded to ensure low-noise operation, and to serve as a ground return for EMI/RFI and transients. Such a ground *does not work as a safety ground* for protection against electrical shock!

This symbol means an alternating current (AC) power line.

This symbol means a direct current (DC) power line derived from an AC power line.

This symbol indicates an electrostatic sensitive device (ESD), meaning that when handling the marked equipment you should observe all standard precautions for handling such devices.

This symbol indicates that a particular step/process or procedure is required to ensure the installation maintains conformity to European requirements.

This symbol indicates that this referenced equipment or material should be re-cycled and not thrown in the normal trash stream.

This symbol indicates that the step/process or equipment has an environmental consequence and steps such as recycling are required.

These safety-related terms appear in this manual:

NOTE: Statements identify information that you should consider before moving to the next instruction or choice.

Caution: Statements identify conditions or practices that could result in damage to the equipment, the software, or other property.

WARNING! Statements identify conditions or practices that could result in personal injury or loss of life.

Follow the precautions below to ensure your personal safety and prevent damage to the system. The central unit is powered by a 15.5 VDC power supply assembly. The system also charges a supplied external Sealed Lead Acid Battery (SLA) that can power the unit when the external power sources fail.

Power Supply Assembly

Plug the PSA's power cord into AC outlets that will not apply more than 260 V_{RMS} between the supply conductors or between either supply conductor or ground. A protective ground connection (provided through the grounding conductor in the PSA and its power cord) is essential for safe operation. The PSA is designed for indoor use only; it must not be subject to immersion in water, high humidity, or temperatures above 70°C.

External Battery

Follow the precautions in this manual when handling and replacing external batteries. Metallic instruments of any kind could short the battery terminals, resulting in fire or explosion. Do not drop the battery or attempt to disassemble it. The only correct replacement battery is a sealed lead-acid battery with relief vents and ratings comparable to the original battery. Never try to use a non-rechargeable battery with the unit.

Grounding the Digitizer

When using the PSA to power the unit from the AC mains supply, remember that the unit is grounded through the PSA power cord. To avoid electric shock, plug the PSA cord into a properly wired receptacle where the protective earth ground has been verified. Do this verification before making any power connections to the unit.

Use the Proper Power Cord

Use the power cord and connector supplied with PSA, or an equivalent IEC-standard power cord. Be sure that it is in good condition.

Antenna, Phone & LAN Cabling

Never install antenna, telephone, or LAN wiring during electrical storms. Always ensure adequate separation between antenna cabling, telecom cabling, or LAN cabling and high voltage wiring. Always perform a safety check on telecom and LAN wiring to measure the voltage before working on the wiring. Remember telephone wiring carries fifty (50) to sixty (60) volts of DC and the ring signal at ninety (90) VAC can deliver a very uncomfortable shock. Power over Ethernet Cabling can carry DC voltages of up to 56VDC. To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. Ethernet LAN ports contain SELV circuits, and some WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

Do Not Operate in Explosive Atmospheres

The unit and the PSA provide no explosive protection from static discharges or arcing components. Do not operate the equipment in an atmosphere of explosive gases.

The EQMet iDAS system is not To Be Used For Life Support or Life-Critical Systems

These products are not designed for operating life critical support systems and should not be used in applications where failure to perform can reasonably be expected to create a risk of harm to property or persons (including the risk of bodily injury and death).

System Overview

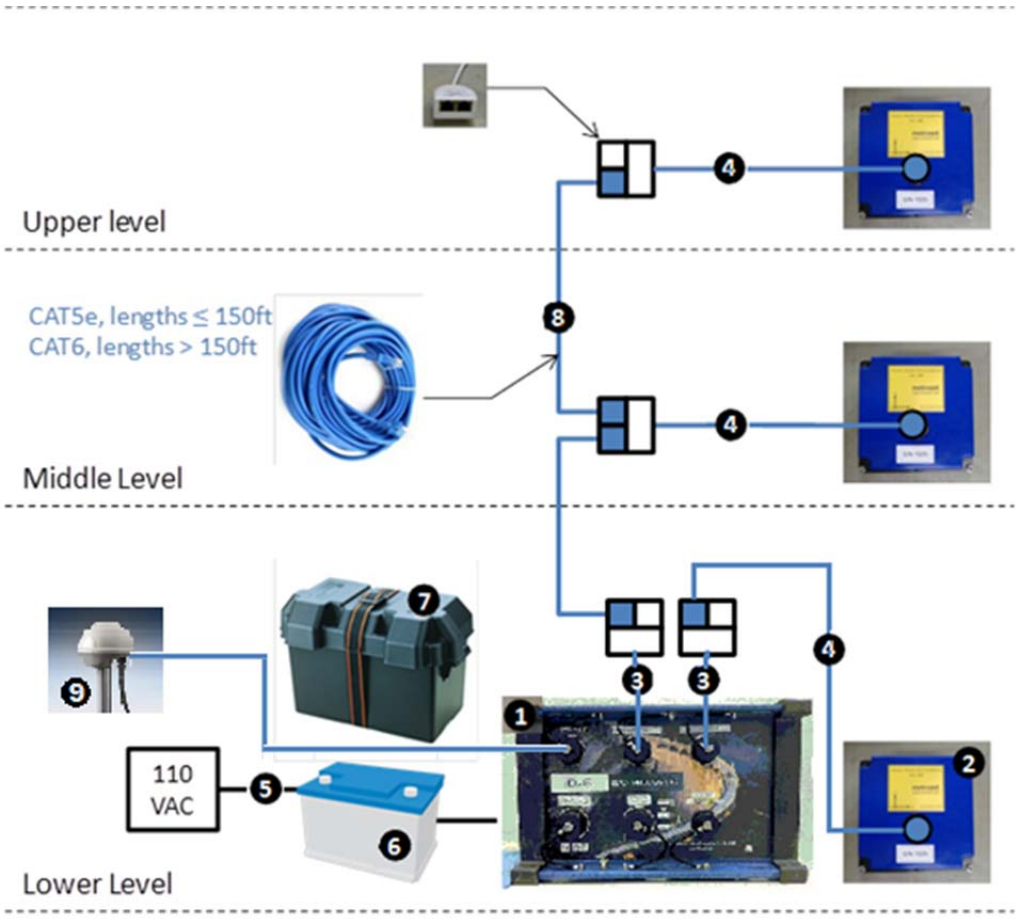
EQMet iDAS for seismic monitoring consists of up to four 3-channel, 24-bit digital seismic accelerometers (TSA-100S-D24) interconnected via inexpensive CAT-5 cable to a central recording unit for common timing, triggering, and storage. The system can be configured as an event recorder and/or with real-time streaming output. Where internet service is provided (e.g., Broadband, GPRS, etc.) the system can be securely accessed from anywhere via a web browser.

The Internet ready, Data Acquisition System (iDAS) system for seismic monitoring, is EQMet's flexible solution to these requirements and consists of a central multi-channel recorder and up to four digital triaxial accelerometers. The iDAS recorder provides each digital sensor power and time over CAT-5 cabling. The instruments are connected in a daisy-chain configuration. A single battery and AC trickle charger is provided near the iDAS recorder.

The table below lists the various components of the iDAS system and the typical configuration is illustrated in the following figure.

ITEM	P/N	DESCRIPTION	QTY
1	112050-PL	iDAS Central Data Recorder with 2X TSA Sensor Interface	1
2	150110-02-PL	24-bit Digital Triaxial Seismic Accelerograph (TSA)	2-4
3	150094-PL	Cable, Sensor Interface to Dual RJ45F, 10ft	AR
4	150093-PL	Cable, TSA to Dual RJ45F, 10ft	AR
5	112259-PL	Power Supply, Wide Input AC Adapter with Battery Leads	1
6	841053	Battery, 12V, 60Ah (optional)	AR
7	851437	Battery Box (optional)	AR
8	N/A	Cable, standard Ethernet for interconnect, variable length	AR
9	111853	External GPS option	1
10	112293-PL	Cable, Ethernet to RJ45M, 6ft (optional)	AR
11	112294-PL	Cable, Console to DB9F, 25ft (optional)	1

AR = As Required



Installation & Setup

Each of the TSA-100S-D24 sensors should be mounted in a location that provides convenient connectivity to the central iDAS recorder and that is not generally accessible to the public. The connection to the iDAS recorder is typically made using standard CAT5 computer cable (CAT6 cable for longer lengths) as detailed in the Digital Sensor Interface section of this manual. The sensors are powered from the iDAS recorder using low voltage DC and do not require an AC power connection.

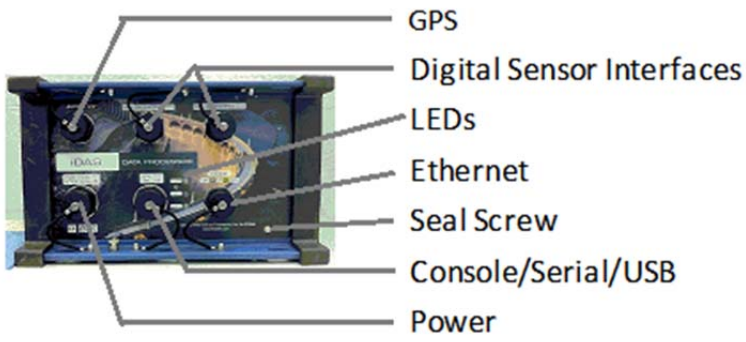
The TSA mounting plate uses adjustable threaded screws to provide three kinematic contact points so that the sensors can be leveled. EQMet recommends that the sensor mounting plate be leveled using a good quality bubble level by adjusting these screws in order to minimize the sensor offset, but the system will work correctly without this step.

Alternatively, single-point mounting adapter plates may be used as well.

Because the system has a single power source, each digital sensor requires power over the same communication cable. And because 48V is supplied, there is potential for damage if inappropriate appliances are connected. For this reason, the connections should be well protected i.e., housed within junction boxes.

iDAS Front Panel

The iDAS front panel consists of several status LEDs and mil-type connectors allowing you to connect power, serial, Ethernet and digital sensor connections.



LEDs

The LEDs on the front panel provide the following information:

Power:

- OFF - No power
- Steady Green - Running off of external power or POE (Power Over Ethernet)
- Flashing Green - The system is starting up
- Infrequent Green - Running off of battery

Status:

- OFF - Working, no time source
- Steady Red - Power supply boot loader turned on. Used to load new power supply firmware
- Flashing Red - System fault detected
- Infrequent Red - System error detected
- Steady Green - Waiting to turn on. In initial start up delay or timed operation window
- Flashing Green - The system is starting up
- Orange – Super-capacitor is being charged
- Alternating Red and Green - The system is shutting down

Event:

- OFF - No events
- Flashing Green - Unused condition
- Infrequent Green - Events stored

Ethernet Link (Green):

- ON - Ethernet 10Mb link detected
- OFF - No Ethernet link detected

Ethernet Data (Amber):

- ON - Ethernet data transmission in progress
- OFF - Idle

Power

This connector provides access to external power input, and the external battery connection.

The external power input allows provision of an external DC power source that is used both to operate the unit and charge a battery, if connected.

The external battery connection is used to connect a battery that will be float charged by the system to provide operational autonomy in the case of temporary loss of external power.

Console/Serial/USB

This connector provides access to the console port connection, primary serial port, and USB device interface.

The console port connection is used to provide access to the operating system console that is required in initial setup of the system (before network interfaces are defined) and in certain diagnostic and maintenance operations. The console port is not needed in normal operation. The console port is /dev/console and the default baud rate is 38400.

The primary serial port is an RS-232 serial port that can be used by user application software for a variety of purposes. The serial port supports full hardware handshaking. The serial port is /dev/ttyS0 and the default baud rate is 9600.

The USB device interface is planned for future use and is not functional as of this manual version.

Ethernet

This connector provides low power 10Mb Ethernet connections.

Ethernet is typically used for connection to local equipment, such as local digitizers and/or a local hub or switch for data transfer and unit configuration.

Digital Sensor Interface

This connector provides communication, power, and timing to the attached TSA sensors. And because 48V is supplied, there is potential for damage if inappropriate appliances are connected

Caution: The Digital Sensor Interface connector supplies 48VDC power to Digital Sensor over CAT5 cabling with standard RJ45 connectors. Do NOT connect any Ethernet device to this interface or it will be damaged.

External GPS

The optional external GPS system provides same accurate timing with the benefit of allowing the GPS engine/antenna to be located much further away from the digitizer. Distances of 1500 feet (~450m) are possible using standard CAT-5 cable. The external GPS system is used to time align the data typically to sub-microsecond accuracy.

External GPS Lightning Protection

The External GPS engine/antenna does not have built-in lightning protection, due to the high cost of protective devices that can pass the low-level, high-frequency signals used in GPS systems. A lightning protection kit is not available. The External GPS does have gas arrestors on all signal and power pairs.

GPS Antenna Connection Cabling

The cabling between the digitizer and the GPS engine/antenna is done in three parts.

First, a cable between the EXT GPS connector of the digitizer terminates with a weatherized RJ-45 jack.

Second cable from the GPS engine/antenna terminated with another weatherized RJ-45 jack. This jack mounts on the same bracket that mechanically connects to the engine/antenna with a short length of ¾ inch diameter pipe.

Finally, a customer selected length of CAT-5 cable with field installed weatherized RJ-45 plugs connects two weatherized RJ-45 jacks. Field installable RJ-45 plug kits together with a crimping tool and spare RJ45-plugs are included.

It is usually a good idea to secure the EXT GPS to CAT-5 connection against mechanical disturbance.

Once the CAT-5 cable is run, the digitizer and GPS engine/antenna can be connected to each end. This 3 part cable arrangement allows a contractor to run the CAT-5 cable using either ordinary RJ-45 network connectors or the weatherized connectors using the crimping tool and instructions provided included in the kit.

Seal Screw

The small screw located in the lower right of the front panel is the seal screw. It is used at the factory for leak testing.

Caution: This screw should NOT be removed by the user as doing so may expose the internals of the unit to the environment and damage it.

Operating Environment

The iDAS needs to be installed in a location that provides the following environmental conditions.

The iDAS operating temperature range with the standard options is: -20 to +60 °C

This can be limited by user installed equipment. Replacing the storage cards with commodity cards can reduce the operating temperature range.

The iDAS is configured to only charge an attached Sealed Lead Acid (SLA) battery from: -0.0 to + 40.0 °C

The unit will draw power from an SLA battery over the full operating temperature range but will show a fault if it runs outside of the range: - 15.0 to + 50.0 °C

The unit should not be placed where it is exposed to direct sunlight and the external battery used should be located in the same temperature environment as the unit and should again not be exposed to direct sunlight.

The case of the unit is designed to meet the requirements of a NEMA 6P enclosure (equivalent to IP67). The system can operate in humidity levels of up to 100%. The unit should be protected from rain and snow and should not be allowed to stand in water for longer than one hour.

Unpacking & Inspecting the Unit

Before accepting the shipment the shipping carton should be examined for any obvious damage and this should be recorded by the freight carrier.

The iDAS ships in a custom designed carton. This carton can be used to return the unit or to ship it to other destinations. It should be carefully opened at the top so it can be re-used.

On top of the unit is an additional carton that will contain any accessories ordered with the unit such as connectors, cables, AC/DC power supply. Please check the contents of this box against the packing list.

The iDAS is beneath this box packed in custom foam inserts. Carefully pull the unit and the inserts from the box. The unit should have no signs of external damage.

The unit is then ready for installation.

When the packaging is no longer required please recycle the cardboard cartons and foam insert appropriately.

Cleaning the iDAS

Disconnect all power from the unit before cleaning it including the external battery. Then wipe off the exterior surfaces with a mild detergent and a damp soft cloth. Do not use an abrasive cloth especially on the label area as this will damage the unit. The external battery can also be cleaned with a mild detergent and damp cloth following the precautions outlined in the battery maintenance section.

Caution: Possible water damage. Do not loosen the seal screw or end caps before cleaning the unit. Do not use water to clean the inside of the recorder. Doing so will severely damage the unit!

The iDAS should not normally be opened so the interior of the unit should be clean. If dust or debris does get inside the unit, we recommend you use a small "computer vacuum cleaner" to remove this debris. Make sure you have turned the power off before vacuuming the unit.

Maintenance Service

As part of the applicable building code specifications, the iDAS system requires a yearly maintenance visit. At this visit, service engineers approved by local municipality will perform all required maintenance.

If your unit appears to need repair or service in between maintenance visits, please contact EQMet.

System Configuration

The factory default setup is as follows and may be changed by the user:

PARAMETER DESCRIPTION	VALUE
Full Scale Measurement Range	±4g
Sample Rate	200sps
Trigger Threshold	0.01g (0.25% FS)
Pre-Event Time	20s
Post-Event Time	30s
Data File Format	EVT
Votes to trigger	1
Votes to detrigger	1
Trigger Filter	Classic Strong Motion

Triggered Recording

Pre- & Post-Event Time

The pre-event time determines how many seconds of data before the trigger criteria were met will be recorded in the event file. It is set at 20s.

The post event time determines how many seconds after the system has de-triggered will be recorded in the file. It is set at 30s.

Channel Triggering

The threshold trigger has two parameters for each channel. The first is the threshold trigger, which is the level in percent of full scale that causes the channel to trigger. It is set at 0.01g or 0.25% of full scale range which is 4g.

The second parameter is the threshold de-trigger. This is the value in percent of full scale the signal must fall below after triggering for the channel to detrigger. It is set at 0.01g or 0.25% of full scale range which is 4g.

The pre-trigger filter is set as the classic strong motion filter. At a sampling rate of 200 Hz, this puts the band-pass at approximately 0.1 to 12.5Hz

Each channel is assigned one vote that it casts towards getting the system to trigger.

System Configuration Changes

iDAS functionality is provided by the Rockhound data acquisition software which was written by Kinemetrics, Inc. The Rockhound software runs on the iDAS under the Linux operating system.

Linux provides control of system peripherals such as memory, storage, CPU and network services.

Rockhound provides all services related to data acquisition including collecting data from the TSA-100S-D24 sensors, triggering, recording and telemetry. Rockhound is very flexible and allows the user to make configuration changes to operational parameters, recording formats and methods and more. Rockhound is configured through a browser-based interface.

By logging into Linux you may configure network services via the *netconfig* script to act as a DHCP client, DHCP server or to use a static IP address. You will likely have to run *netconfig* once to initially set up the network.

The default passwords are as follows (we strongly suggest you change them):

Use	**User name**	**Password**
Linux	root	kmi
Web server	rock	kmi

Basic Rockhound operation can usually be accomplished directly using the web interface. Significantly more detail is available in the Rockhound User Manual, p/n 304702. A Rockhound training course is recommended for advanced applications.

Cable References

This section contains cable and connector reference material.

Power Connector

Connector: 851-07P14-12PX54-A7, 12 Pins, Shell 14, Rotated X, Blk, (8x1,4x1.6)

Mating Connector: 851-06EC14-12SX54, 12 Sockets, Shell 14, Rotated X, Blk (KMI 852173)

Power In from 8-18VDC source needs to be ~15.5V for Battery Charging. This connector uses pins as power is supplied to the unit, charging current is only output from the unit when power has been supplied through the connector. The power pins are provided with Reverse Polarity Protection, ESD & EMI Protection, and protection from lightning induced transients using Gas Arresters.

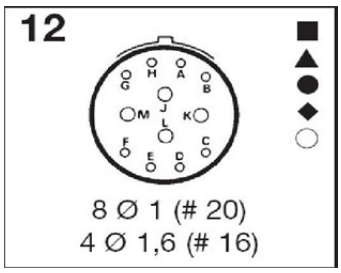
The battery charging circuit is designed to charge and take power from a 12V SLA battery. (Observe all safety warnings and cautions!) It features Reverse Polarity Protection, ESD & EMI Protection, and protection from lightning induced transients using Gas Arresters.

The digital inputs and outputs are isolated from the system and have both ESD and EMI protection. They are not protected against lightning induced transients.

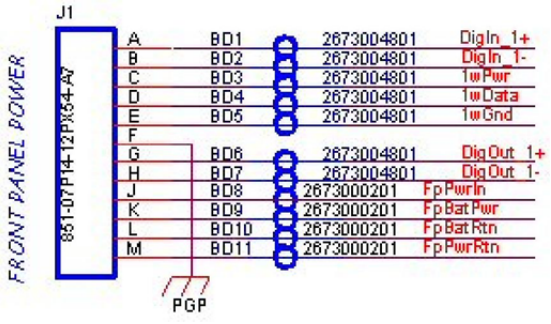
Power **Connector** Description

Pin	Name	Description	Protection	Comments
A	DIGIN_1+	General Purpose Digital Input 1+	ISO/ESD/EMI	General Purpose Input - Connect to ENETBPWR+ for Baler Simulation
B	DIGIN_1-	General Purpose Digital Input 1-	ISO/ESD/EMI	General Purpose Input - Connect to ENETBPWR+ for Baler Simulation
C	1WPWR	Power to PSE 1 Wire Device	ESD/EMI	Used to Control KMI Power Options
D	1WDATA	Data to/from PSE 1 Wire Device	ESD/EMI	Used to Control KMI Power Options
E	1WGND	Digital Ground	ESD/EMI	Used to Control KMI Power Options
F	PGP	Protective Ground	N/A	Protective Ground Connection
G	DIGOUT_1+	General Purpose Digital Output 1+	ISO/ESD/EMI	General Purpose Output - can be used as Trigger
H	DIGOUT_1-	General Purpose Digital Output 1-	ISO/ESD/EMI	General Purpose Output - can be used as Trigger
J	FPPWRIN	8-16VDC In to System	RP/LIT/ESD/EMI	System Power Input
K	FPBATPWR	Power to External Battery	RP/LIT/ESD/EMI	Charge Output/Battery Input
L	FPBATRTN	Power Return from Battery	RP/LIT/ESD/EMI	Battery Return
M	FPPWRRTN	Power Return	RP/LIT/ESD/EMI	System Power Return

Power Connector Pins



Power Connector Wiring Diagram



Serial, USB, Console Connector

Connector: 851-07P14-18PX54-A7, 18 Pins, Shell 14, Rotated X, Blk

Mating Connector: 851-06EC14-18SX54, 18 Sockets, Shell 14, Rotated X, Blk (KMI 852174)

This connector includes a full function RS232 port that can be used as a communication interface to the system. The DSR line can also be monitored to turn the system on allowing the unit to function with a Q330 controlling power via the serial port connection.

The USB 1.1 interface is present to allow a laptop to connect to the unit via USB. (Future Software Function)

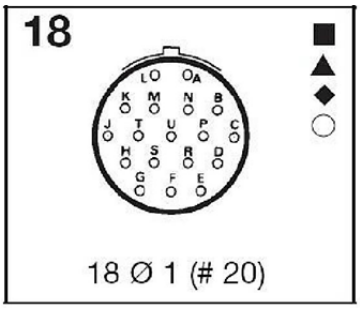
The three wire RS232 console connection is also present for system set up and repair. This is not meant as a port to be used for data input or output.

Pins are used as the USB interface supplies 5V to the unit so power is present on the connecting cable. Protection levels for all pins are ESD/EMI only as long external cables are not supposed to connect to these pins.

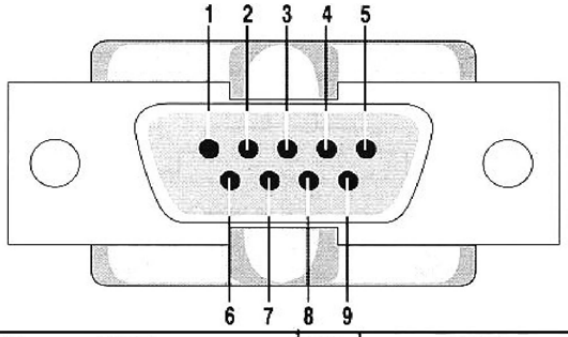
Serial/USB/Console Connector Description

Pin	Name	Description	Protection	Standard Connector Pins	Comments
A	X1DCD	Serial Port 1 DCD	ESD/EMI	DB9-1	
B	X1RXD	Serial Port 1 Receive to Unit	ESD/EMI	DB9-3	
C	X1TXD	Serial Port 1 Transmit from Unit	ESD/EMI	DB9-2	
D	X1DTR	Serial Port 1 DTR	ESD/EMI	DB9-4	
E	X1COM	Serial Port 1 Common	ESD/EMI	DB9-5	
F	X1DSR-ON	Serial Port 1 DSR	ESD/EMI	DB9-6	Routed to PSOC for System Turn On
G	X1RTS	Serial Port 1 RTS	ESD/EMI	DB9-7	
H	X1CTS	Serial Port 1 CTS	ESD/EMI	DB9-8	
J	X1RI	Serial Port 1 RI	ESD/EMI	DB9-9	
K	USBDATA+	USB Data Differential Plus	ESD/EMI	USBA-3	USB 1.1 Device Interface
L	USB DATA-	USB Data Differential Minus	ESD/EMI	USBA-2	USB 1.1 Device Interface
M	USBGND	Power Return to USB Host/Hub	ESD/EMI	USBA-4	USB 1.1 Device Interface
N	USBVCC	Power from USB Host/Hub	ESD/EMI	USBA-1	USB 1.1 Device Interface
P	PGP	Protective Ground	N/A	USBA-Shield	
R	CONRXD	Console RS232 RX	ESD/EMI	DB-9(C) Pin 3	Console for System Setup/Recovery Only!
S	CONTXD	Console RS232 TX	ESD/EMI	DB-9(C) Pin 2	Console for System Setup/Recovery Only!
T	CONCOM	Console Common	ESD/EMI	DB-9(C) Pin 5	Console for System Setup/Recovery Only!
U	PGP	Protective Ground	N/A	DB-9 Shell	Use for Both RS232's

Serial/USB/Console Connector Pins



Serial/USB/Console DB-9 Connector Pins



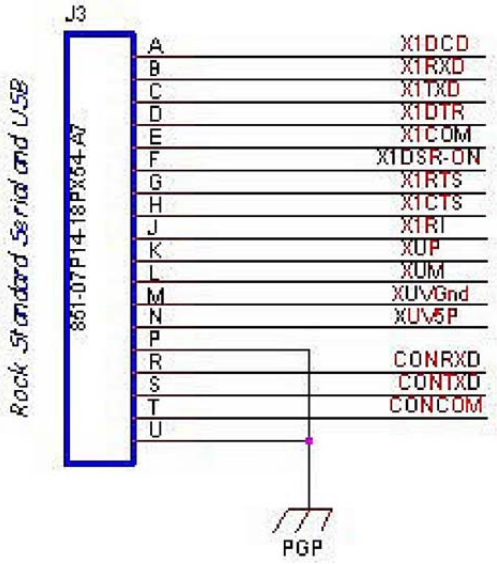
Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

Serial/USB/Console USB Connector Pins

USB Series "A" and Series "B" Connector Termination Assignment

Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain Wire

Serial/USB/Console Connector Wiring Diagram



Ethernet LAN Connector

Connector: 851-07P12-8PX54-A7, 8 Pins, Shell 12, Rotated X, Blk

Mating Connector: 851-06EC12-8SX54, 8 Sockets, Shell 12, Rotated X, Blk (KMI 852175)

This pin definition supports the POE option on the Mil Type connector for a 10-Base-T connection. The pins correspond to the 8 wires in the four pair cable. The transmission and receive pairs are on the outside. This connector uses pins as power is present on the incoming cable. The Ethernet connections are all isolated with a 1500V Transformer followed by semiconductor transient suppressors. EMI protection is provided by high frequency ferrite beads on the connector.

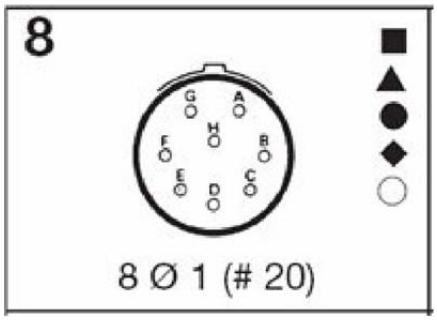
Wiring colors are per EIA T568B color code.

As there is no shield on a CAT-5(e) cable there is no need for a separate PGP pin. (Connector J4 on Front Panel)

Ethernet LAN Connector Description

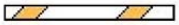
Pin	Name	Description	Protection	RJ-45 Pin & Wire Color (T568B)	Comments
A	E1RX+	10 Base-T Ethernet Data Receive +	ISO/ESD/EMI	Pin 3 White/Green	
B	E1RX-	10 Base-T Ethernet Data Receive -	ISO/ESD/EMI	Pin 6 Green	
C	E1TX+	10 Base-T Ethernet Data Transmit +	ISO/ESD/EMI	Pin 1 White/Orange	
D	E1TX-	10 Base-T Ethernet Data Transmit -	ISO/ESD/EMI	Pin 2 Orange	
E	TOE+	10 Base-T Ethernet Spare Pair 1+	ISO/ESD/EMI	Pin 8 Brown	Power over Ethernet Option
F	TOE-	10 Base-T Ethernet Spare Pair 1-	ISO/ESD/EMI	Pin 7 White/Brown	Power over Ethernet Option
G	SP+	10 Base-T Ethernet Spare Pair 2+	ISO/ESD/EMI	Pin 4 Blue	Power over Ethernet Option
H	SP-	10 Base-T Ethernet Spare Pair 2-	ISO/ESD/EMI	Pin 5 White/Blue	Power over Ethernet Option

Ethernet LAN Connector Pins



Ethernet LAN Connector Wiring Diagram

Ethernet Wiring Colors

RJ45 Pin #	Wire Color (T568B)	Wire Diagram (T568B)	10Base-T Signal 100Base-TX Signal	1000Base-T Signal
1	White/Orange		Transmit+	BI_DA+
2	Orange		Transmit-	BI_DA-
3	White/Green		Receive+	BI_DB+
4	Blue		Unused	BI_DC+
5	White/Blue		Unused	BI_DC-
6	Green		Receive-	BI_DB-
7	White/Brown		Unused	BI_DD+
8	Brown		Unused	BI_DD-

Digital Sensor Interface Cable

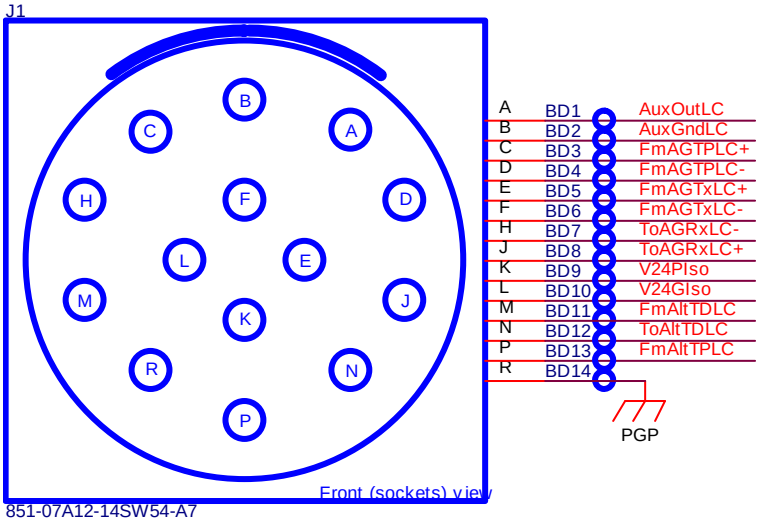
The TSA-100S-D24 sensors are connected to the central iDAS station using twisted pair wiring with four twisted pairs, 24AWG or larger, with a resistance of 0.188 ohms/meter or less and a nominal high frequency impedance of 100 ohms ±15 ohms. Standard CAT5, CAT5E, or CAT6 computer cable meets these requirements. The connections are as follows

Usage	**RJ45 Connector Pin Numbers**	**iDAS connector pin number (10 pin Souriau)**	**Sensor connector pin number (18 pin Souriau)**
RS485 Tx Non-Inverting Shared RS485 Tx and RS485 Rx Non-Inverting (if half duplex)	Pin 1 (Pair #3)	A	M
RS485 Tx Inverting Shared RS485 Tx and RS485 Rx Inverting (if half duplex)	Pin 2 (Pair #3)	B	N
Ground	Pins 7 and 8 (Pair #4)	D	J
Plant HV in	Pins 4 and 5 (Pair #1)	E	K
PPS Rx Non-Inverting	Pin 3 (Pair #2)	G	S
PPS Rx Inverting	Pin 6 (Pair #2)	K	G

External GPS Connector

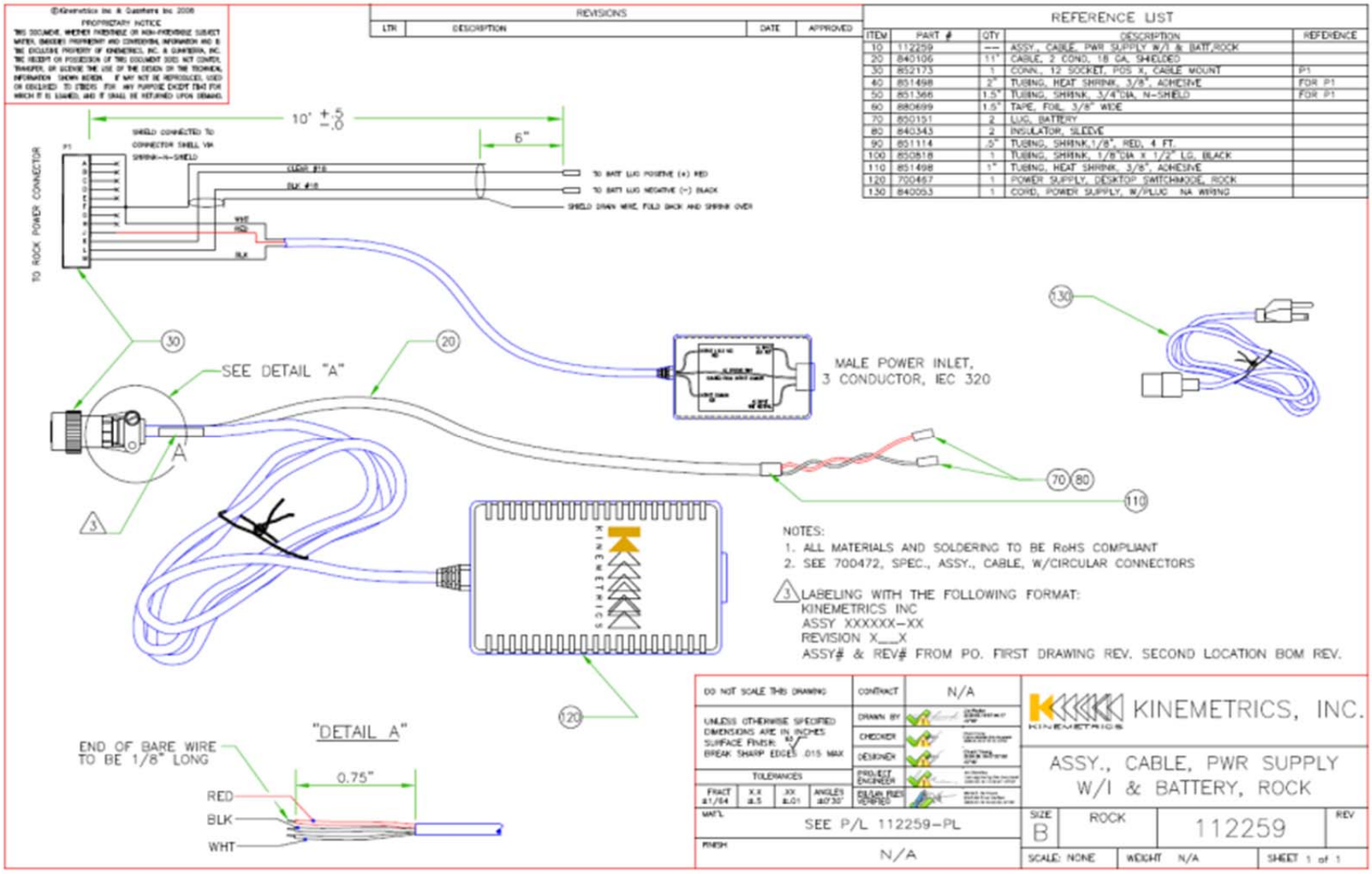
Pin	Name	Signal	Description
C	FmAGTPLC+	1 PPS Transmit +	Time Pulse from Acutime Gold to External GPS RS422 +
D	FmAGTPLC-	1 PPS Transmit -	Time Pulse from Acutime Gold to External GPS RS422 -
E	FmAGTxLC+	Port B: Transmit +	Acutime Gold Transmit to External GPS Receive RS422 +
F	FmAGTxLC-	Port B: Transmit -	Acutime Gold Transmit to External GPS Receive RS422 -
H	ToAGRxLC-	Port B: Receive -	External GPS Transmit to Acutime Gold Receive RS422 +
J	ToAGRxLC+	Port B: Receive +	External GPS Transmit to Acutime Gold Receive RS422 -
K	V24PIso	DC Power	+24 V power from External GPS To Acutime Gold
L	V24GIso	DC Ground	+24 V ground from External GPS To Acutime Gold

External GPS Connector Wiring Diagram



Drawings

P/N 112259-PL, AC Power Supply



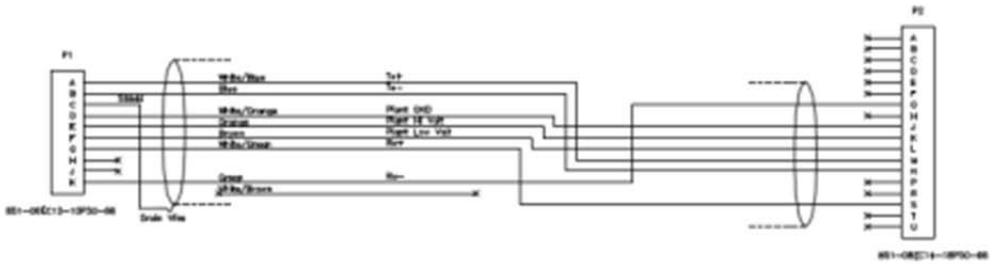
P/N 150090-PL, iDAS Interface to TSA

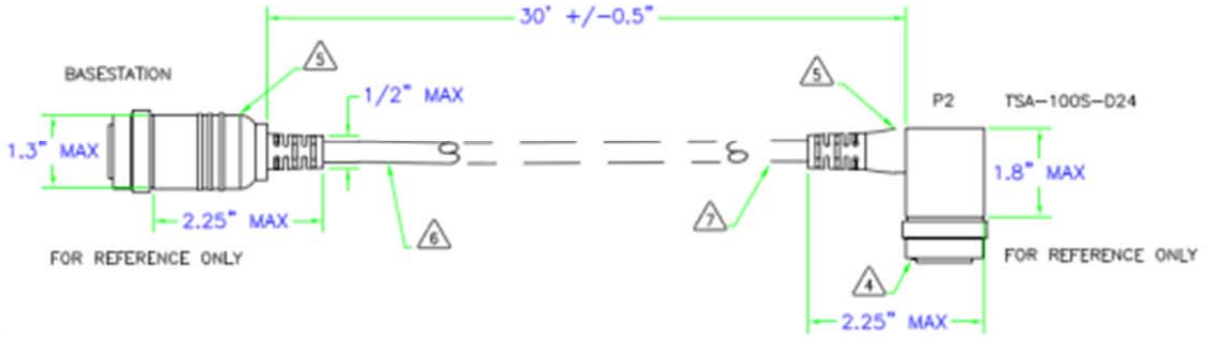
REFERENCE LIST

ITEM	COMPANY P/N	MFG	UM	QTY	DESCRIPTION	REFERENCE	COMMENTS
1	851-06EC12-10P50-66	SOURIAU	EA	1	CONN, 10 PIN, MALE	P1	OR EQUIVALENT W/O SHOCKHELL
2	851-06EC14-18P50-66	SOURIAU	EA	1	CONN, 18 PIN, 90 DEGREE	P2	OR EQUIVALENT W/O SHOCKHELL
3	CAT5-FLEX-SH	CABLE WHOLESALE	FT	30	CABLE, 4 TWISTED PAIRS, 26 AWG		JACKET COLOR: BLACK

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	CORRECTION TO WIRE SIZE TO MATCH MFG. SIZE; SEE ECO 4200		





NOTES: UNLESS OTHERWISE SPECIFIED.

1. SEE 700471, SPEC., ASSY., CABLE, W/MOLDED CONNECTORS.
2. OVERMOLD COLOR TO BE BLACK, P1 & P2
3. CABLE ASSEMBLY NON-RoHS COMPLIANT
4. CONNECTOR KEY WAY TO BE ALIGNED WITH CABLE.
5. ALL OVERMOLD DIMENSIONS TYP NOT EXACT
6. LABEL WITH THE FOLLOWING "P1"
7. LABEL WITH THE FOLLOWING "P2"
8. ——« = NO CONNECT

DO NOT SCALE THIS DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES SURFACE FINISH: 63 BREAK SHARP EDGES .015 MAX
TOLERANCES: FRACT ±1/64 | .XX ±.010 | .XXX ±.005 | ANGLES ±0°30'
MAT'L N/A
FINISH N/A

CONTRACT	N/A	
DRAWN BY	B	06/24/10
CHECKER	CY	06/24/10
DESIGNER	B	06/28/10
PROJECT ENGINEER	B	06/28/10
QUALIFIED VERIFIED	MDH	06/28/10

KINEMETRICS, INC.

ASSY., CABLE, MOLDED
TSA-BASESTATION

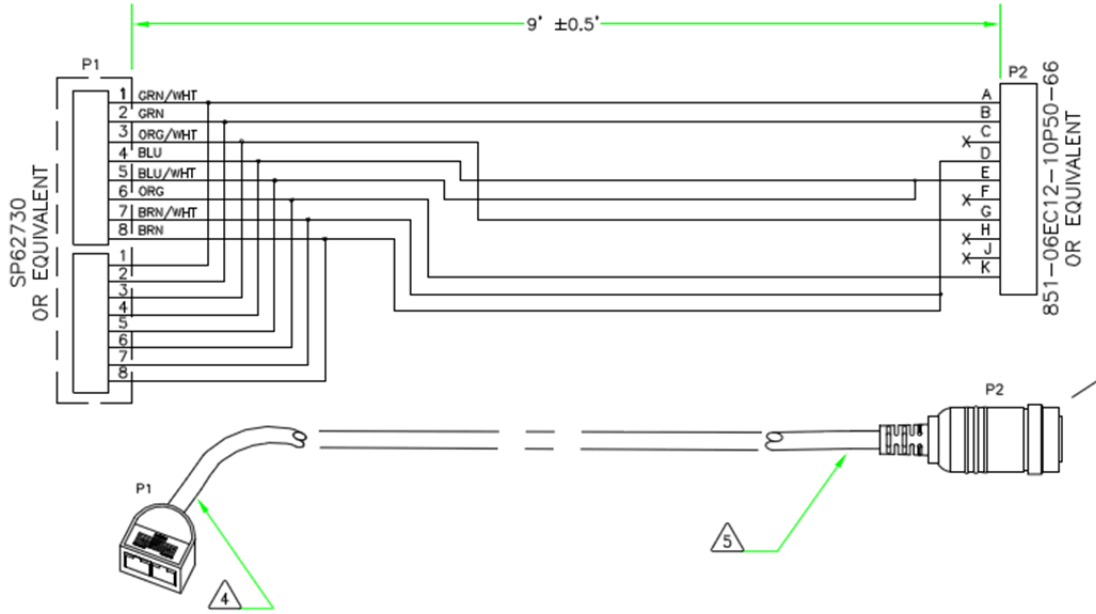
SIZE			REV
B	TSA	150090	A
SCALE:	WEIGHT N/A	SHEET 1 of 1	

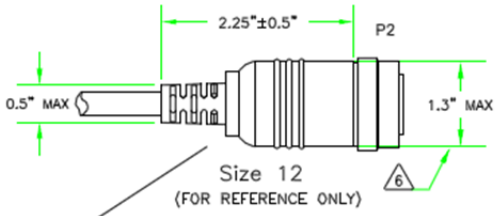
P/N 150094-PL, iDAS Interface to Dual RJ45F

REFERENCE LIST

ITEM	COMM#	MFG	UM	QTY	DESCRIPTION	REFERENCE	COMMENTS
1	SP62730	L-COM	EA	1	CONN., DUAL RJ45, W/10 FT CABLE	P1	OR EQUIVALENT
2	851-06EC12-10P50-66	SOURIAU	EA	1	CONN., 10 PIN, CABLE MOUNT	P2	OR EQUIVALENT (W/O BACK SHELL)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	CABLE LG & TOL. CHGD FROM 5' +/-1' TO 9' +/-0.5', SEE ECO NO. 4259		





NOTES: UNLESS OTHERWISE SPECIFIED.

1. MANUFACTURE PER 700471, SPEC., ASSY., CABLE, W/MOLDED CONNECTORS.
2. OVERMOLD COLOR TO BE BLACK
3. CABLE ASSEMBLY NON-RoHS COMPLIANT
4. LABEL WITH THE FOLLOWING: "P1" PLUS INFORMATION CALLED FOR BY SPEC CTRL 700471 "LABELING" SECTION.
5. LABEL WITH THE FOLLOWING: "P2"
6. ALL OVERMOLD DIMENSIONS, TYPICAL NOT EXACT.

DO NOT SCALE THIS DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
SURFACE FINISH: 63
BREAK SHARP EDGES .015 MAX

TOLERANCES			
FRACT ±1/64	.XX ±.010	.XXX ±.005	ANGLES ±0°30'

MAT'L N/A

FINISH N/A

CONTRACT	N/A	
DRAWN BY	CY	01/11/2011
CHECKER	SJM	01/11/2011
DESIGNER	SJM	01/11/2011
PROJECT ENGINEER	SJM	01/11/2011
EQ/LAB FILES VERIFIED	MDH	01/11/2011

KINEMETRICS, INC.

ASSY., CABLE, MOLDED, SLATE TO RJ45

SIZE			REV
B	TSA	150094	A

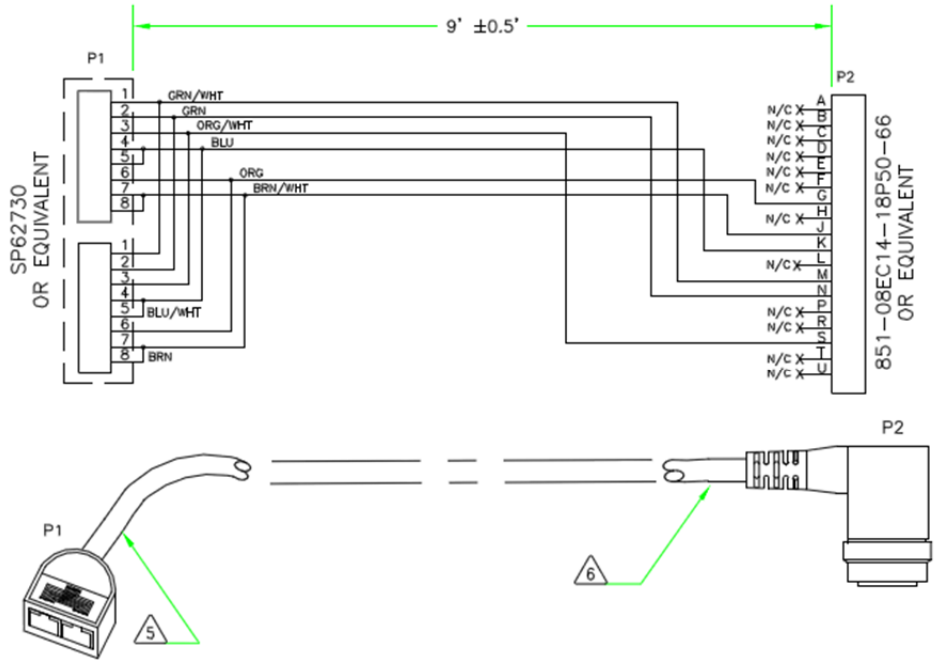
SCALE: N/A WEIGHT N/A SHEET 1 of 1

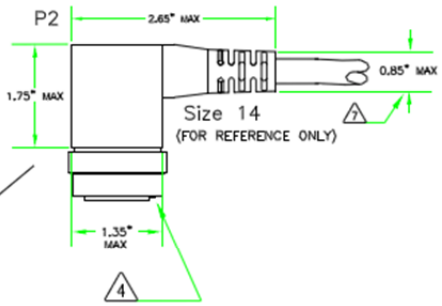
P/N 150093-PL, TSA to Dual RJ45F

REFERENCE LIST

ITEM	COMM#	MFG	UM	QTY	DESCRIPTION	REFERENCE	COMMENTS
1	SP62730	L-COM	EA	1	CONN., DUAL RJ45, W/10 FT CABLE	P1	OR EQUIVALENT
2	851-08EC14-18P50-66	SOURIAU	EA	1	CONN., 18 PIN, CABLE MOUNT, RT ANGLE	P2	OR EQUIVALENT (W/O BACK SHELL)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	CABLE LG & TOL. CHGD FROM 5' +/-1" TO 9' +/-0.5', SEE ECO NO. 4259		





NOTES: UNLESS OTHERWISE SPECIFIED.

1. MANUFACTURE PER 700471, SPEC., ASSY., CABLE, W/MOLDED CONNECTORS.
2. OVERMOLD COLOR TO BE BLACK
3. CABLE ASSEMBLY NON-RoHS COMPLIANT
4. CONNECTOR KEY WAY TO BE ALIGNED WITH CABLE.
5. LABEL WITH THE FOLLOWING: "P1" PLUS INFORMATION CALLED FOR BY SPEC CTRL 700471 "LABELING" SECTION.
6. LABEL WITH THE FOLLOWING: "P2"
7. ALL OVERMOLD DIMENSIONS, TYPICAL NOT EXACT.

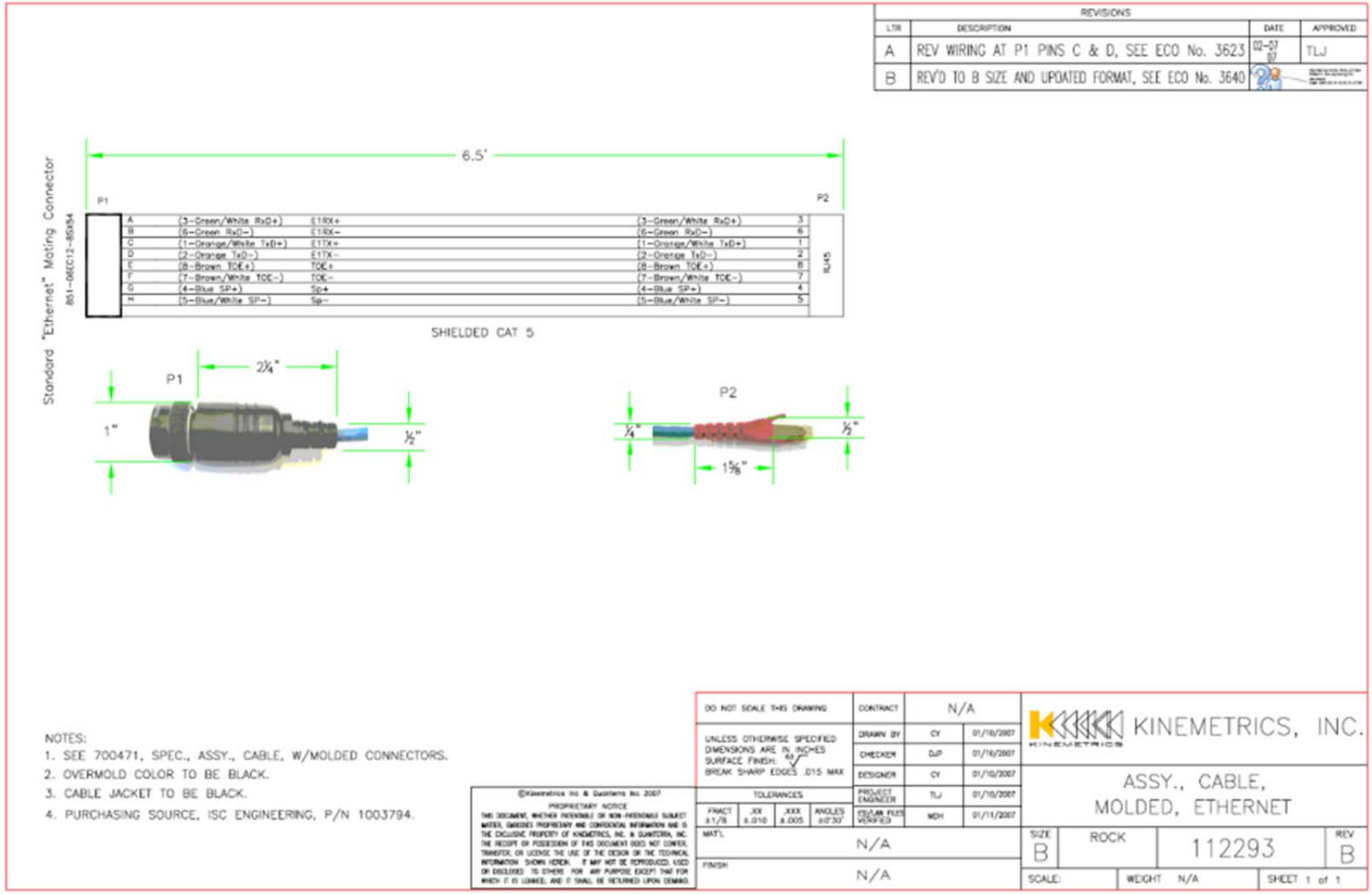
DO NOT SCALE THIS DRAWING	CONTRACT	N/A	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES SURFACE FINISH: 63 BREAK SHARP EDGES .015 MAX	DRAWN BY	CY	01/10/2011
	CHECKER	SJM	01/10/2011
	DESIGNER	SJM	01/10/2011
TOLERANCES: FRACT ±1/64, .XX ±.010, .XXX ±.005, ANGLES ±0°30'	PROJECT ENGINEER	SJM	01/10/2011
	ES/LAI FILES VERIFIED	MDH	01/11/2011
MAT'L	N/A		
FINISH	N/A		

KINEMETRICS, INC.

ASSY., CABLE, MOLDED, TSA TO DUAL RJ45

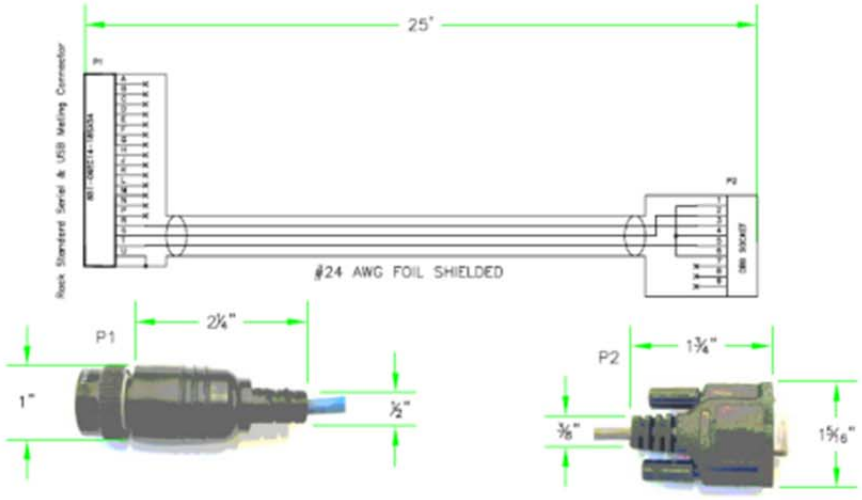
SIZE			REV
B	TSA	150093	A
SCALE: NONE	WEIGHT N/A	SHEET 1 of 1	

P/N 112293-PL, iDAS Ethernet to RJ45M, Optional



P/N 112294-PL, iDAS Console to DB9F, Optional

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	REV'D TO B SIZE AND UPDATED FORMAT, SEE ECO No. 3640		



NOTES:
1. SEE 700471, SPEC., ASSY., CABLE, W/MOLDED CONNECTORS.
2. OVERMOLD COLOR TO BE BLACK.
3. CABLE JACKET TO BE BLACK.
4. PURCHASING SOURCE, ISC ENGINEERING, P/N 1003795.

DO NOT SCALE THIS DRAWING	CONTRACT	N/A
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES SURFACE FINISH: 63 BREAK SHARP EDGES .015 MAX	DRAWN BY	CY 01/10/2007
	CHECKER	EJP 01/10/2007
	DESIGNER	CY 01/10/2007
	PROJECT ENGINEER	TJJ 01/10/2007
	ES/LAB ES VERIFIED	MDH 01/11/2007

TOLERANCES: FRACT ±1/8 | .XX ±.010 | .XXX ±.005 | ANGLES ±0°30'

MAT'L N/A

FINISH N/A

KINEMETRICS, INC.

ASSY., CABLE, MOLDED, CONSOLE

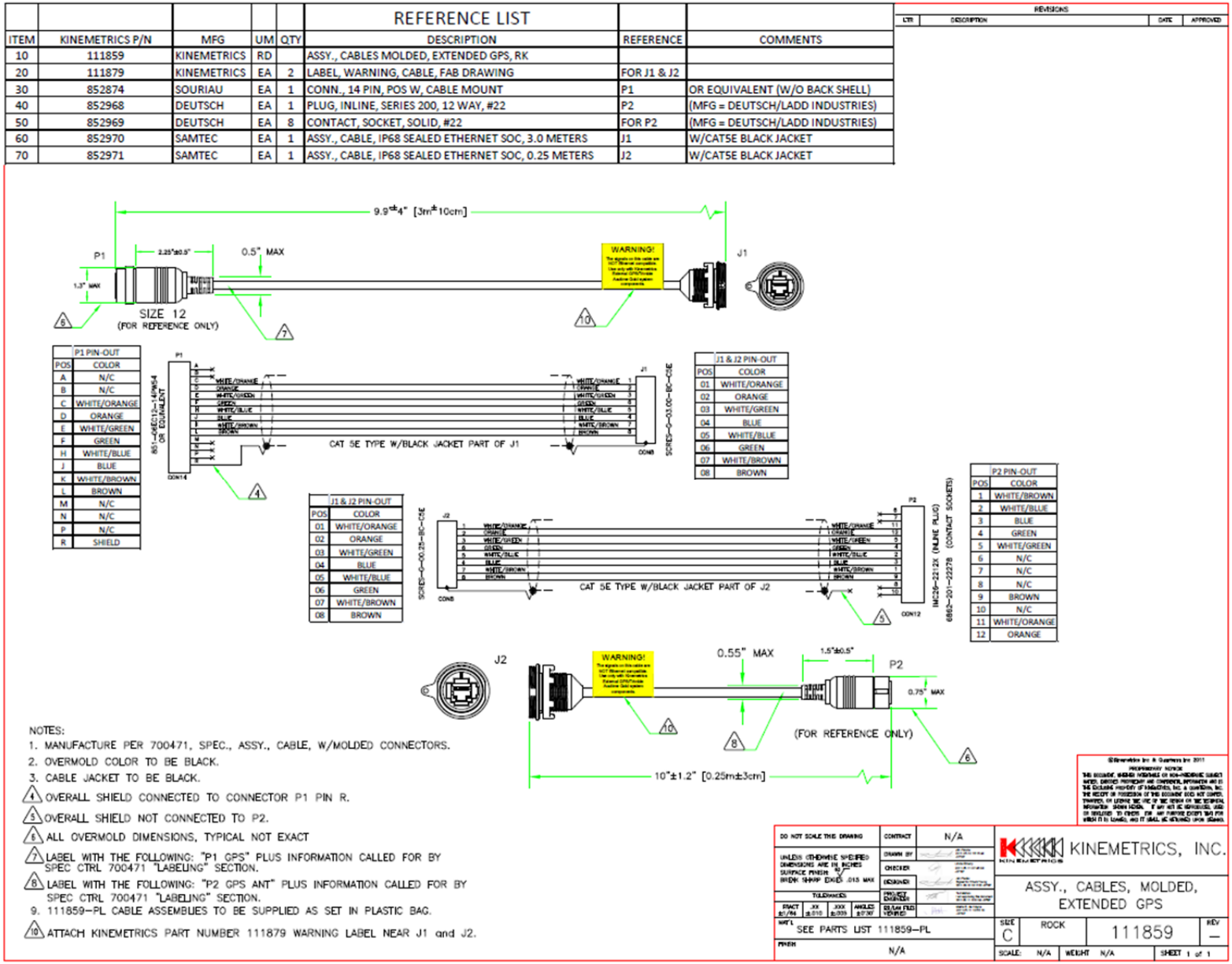
SIZE	ROCK		REV
B		112294	A
SCALE:	WEIGHT N/A	SHEET 1 of 1	

P/N 111859, External GPS Cables

ITEM	KINEMETRICS P/N	MFG	UM	QTY	DESCRIPTION	REFERENCE	COMMENTS
10	111859	KINEMETRICS	RD		ASSY., CABLES MOLDED, EXTENDED GPS, RK		
20	111879	KINEMETRICS	EA	2	LABEL, WARNING, CABLE, FAB DRAWING	FOR J1 & J2	
30	852874	SOURIAU	EA	1	CONN., 14 PIN, POS W, CABLE MOUNT	P1	OR EQUIVALENT (W/O BACK SHELL)
40	852968	DEUTSCH	EA	1	PLUG, INLINE, SERIES 200, 12 WAY, #22	P2	(MFG = DEUTSCH/LADD INDUSTRIES)
50	852969	DEUTSCH	EA	8	CONTACT, SOCKET, SOLID, #22	FOR P2	(MFG = DEUTSCH/LADD INDUSTRIES)
60	852970	SAMTEC	EA	1	ASSY., CABLE, IP68 SEALED ETHERNET SOC, 3.0 METERS	J1	W/CAT5E BLACK JACKET
70	852971	SAMTEC	EA	1	ASSY., CABLE, IP68 SEALED ETHERNET SOC, 0.25 METERS	J2	W/CAT5E BLACK JACKET

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED



P1 PIN-OUT

POS	COLOR
A	N/C
B	N/C
C	WHITE/ORANGE
D	ORANGE
E	WHITE/GREEN
F	GREEN
H	WHITE/BLUE
J	BLUE
K	WHITE/BROWN
L	BROWN
M	N/C
N	N/C
P	N/C
R	SHIELD

J1 & J2 PIN-OUT

POS	COLOR
01	WHITE/ORANGE
02	ORANGE
03	WHITE/GREEN
04	BLUE
05	WHITE/BLUE
06	GREEN
07	WHITE/BROWN
08	BROWN

P2 PIN-OUT

POS	COLOR
1	WHITE/BROWN
2	WHITE/BLUE
3	BLUE
4	GREEN
5	WHITE/GREEN
6	N/C
7	N/C
8	N/C
9	BROWN
10	N/C
11	WHITE/ORANGE
12	ORANGE

NOTES:
1. MANUFACTURE PER 700471, SPEC., ASSY., CABLE, W/MOLDED CONNECTORS.
2. OVERMOLD COLOR TO BE BLACK.
3. CABLE JACKET TO BE BLACK.
4. OVERALL SHIELD CONNECTED TO CONNECTOR P1 PIN R.
5. OVERALL SHIELD NOT CONNECTED TO P2.
6. ALL OVERMOLD DIMENSIONS, TYPICAL NOT EXACT
7. LABEL WITH THE FOLLOWING: "P1 GPS" PLUS INFORMATION CALLED FOR BY SPEC CTRL 700471 "LABELING" SECTION.
8. LABEL WITH THE FOLLOWING: "P2 GPS ANT" PLUS INFORMATION CALLED FOR BY SPEC CTRL 700471 "LABELING" SECTION.
9. 111859-PL CABLE ASSEMBLIES TO BE SUPPLIED AS SET IN PLASTIC BAG.
10. ATTACH KINEMETRICS PART NUMBER 111879 WARNING LABEL NEAR J1 and J2.

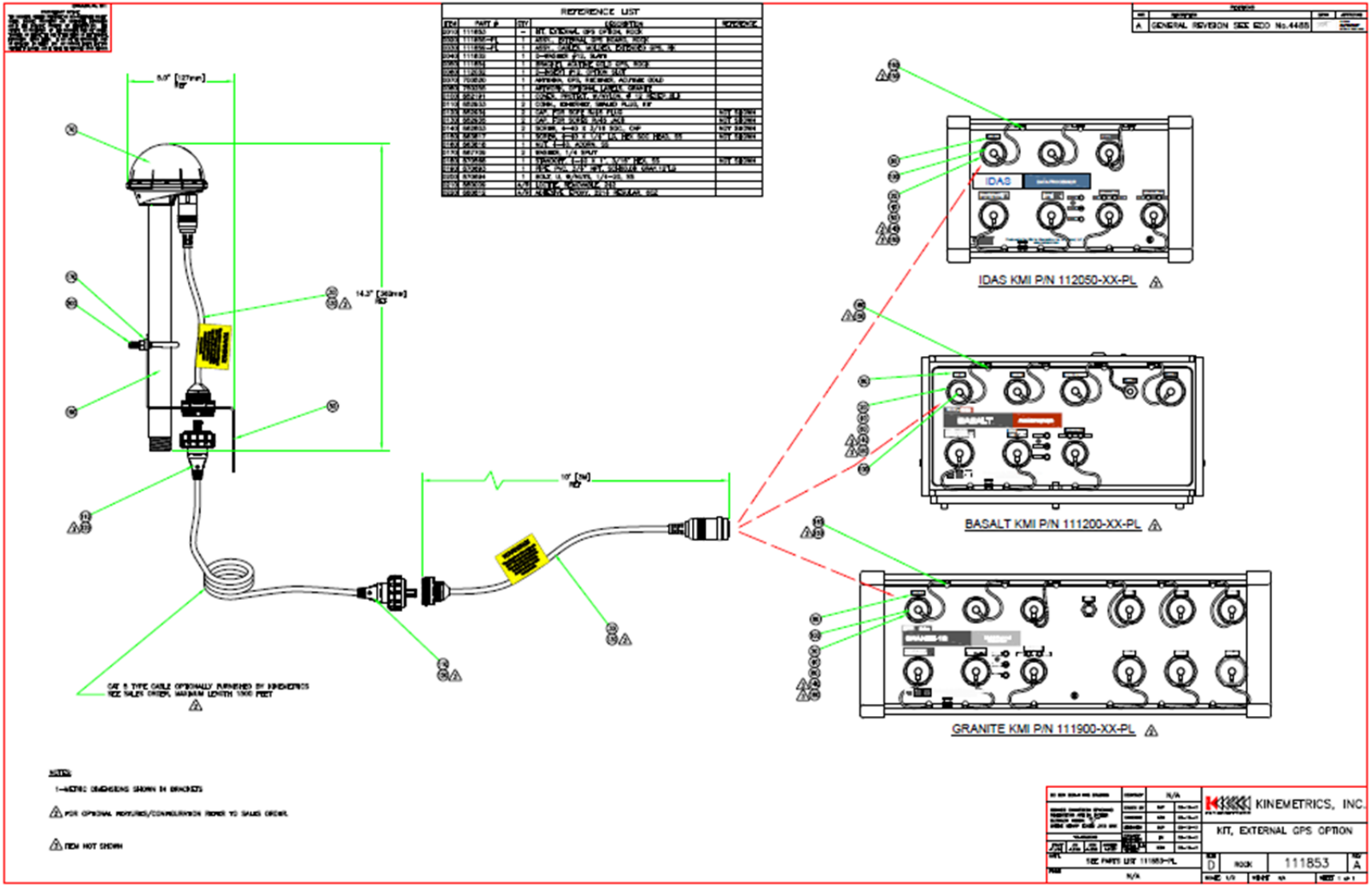
DO NOT SCALE THIS DRAWING — CONTRACT N/A
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES SURFACE FINISH 125/RMS EXCEPT .015 MAX
TOLERANCES: FRACT ±1/64 | .XX ±.010 | .XXX ±.005 | ANGLES ±1°30'
DRAWN BY | CHECKED | DESIGNED | PROJECT ENGINEER | RELEASE FIELD VERIFIED
MAT'L SEE PARTS LIST 111859-PL
FINISH N/A

KINEMETRICS, INC.

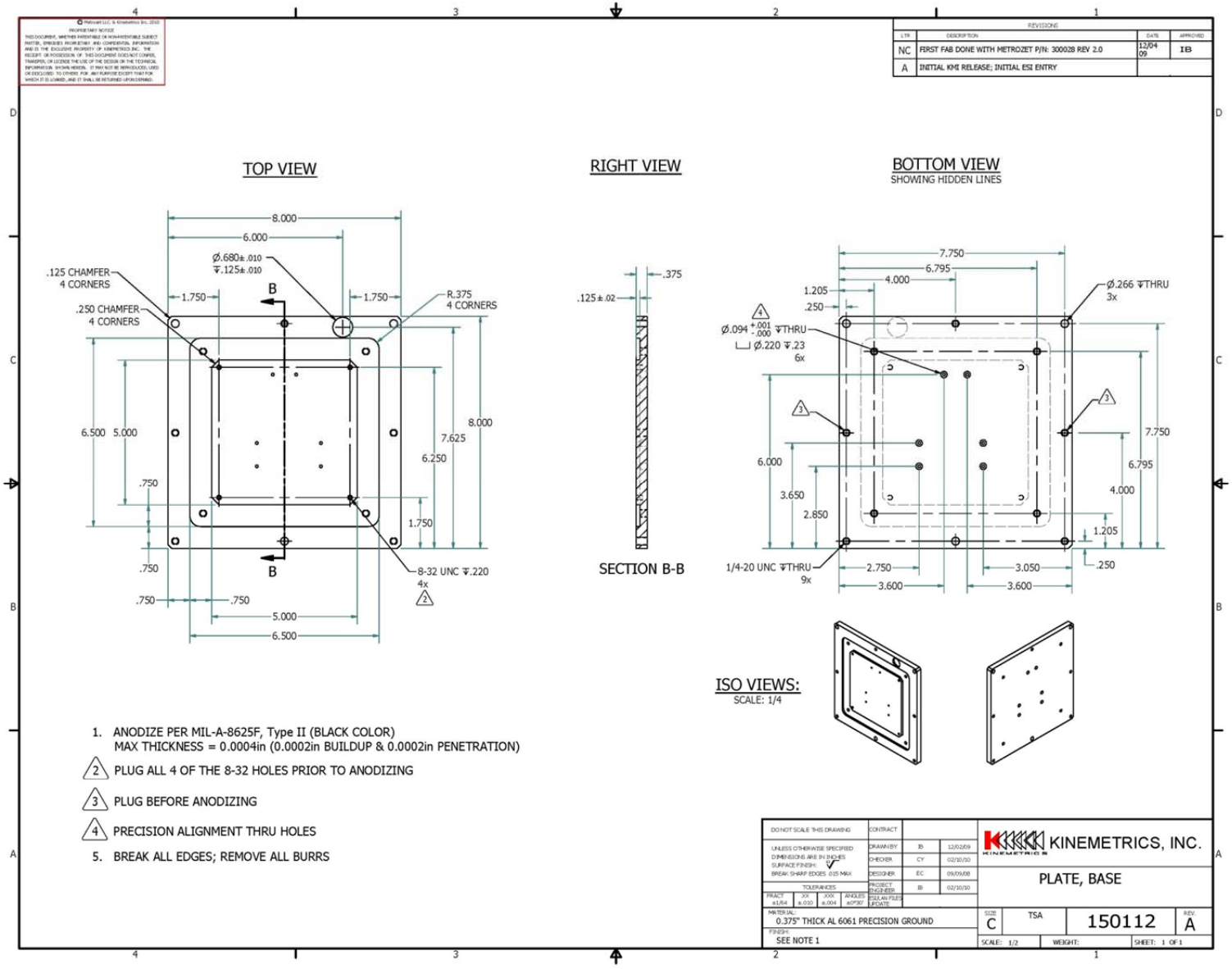
ASSY., CABLES, MOLDED, EXTENDED GPS

SIZE C | ROCK | 111859 | REV —
SCALE: N/A | WEIGHT N/A | SHEET 1 of 1

P/N 111853 External GPS Option



P/N 150112A, Base Plate



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