Pharos™ - Intrinsically Safe Wireless Data Acquisition (DAQ) System - Sheet 1 of 2

*For reference only, please contact your local sales contact for more information.

Description

Effortlessly monitor your well site with one robust, low maintenance, and extensible wireless system. Pharos is an intrinsically safe, modular, low-power and efficient wireless data-acquisition (DAQ) system that monitors many applications, and is especially suited to those difficult-to-instrument regions and tools. Patent-pending technology optimizes battery life, with every bit of capacity going toward meaningful work and automatically entering sleep mode when not in use. The modular system approach separates out the power source, radio transceivers, and sensor bus through the use of connectorized, quick-disconnect cabling.

Features

- Wireless data acquisition
- Low power requirements
- Long battery life
- Quick start up in all temperatures
- Reliable long range signal
- Easy to incorporate new signals
- Intrinsically safe
- Modular
- Quick-disconnect cabling

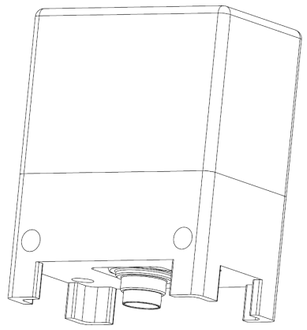
Applications

- Encoder position
- Inclination angle
- Proximity sensing
- Vibration monitoring
- Shock monitoring
- Torque/bending/hookload sensing
- Load-pin monitoring
- Pressure sensing

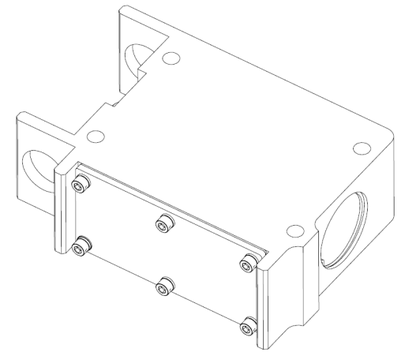
Radio Node

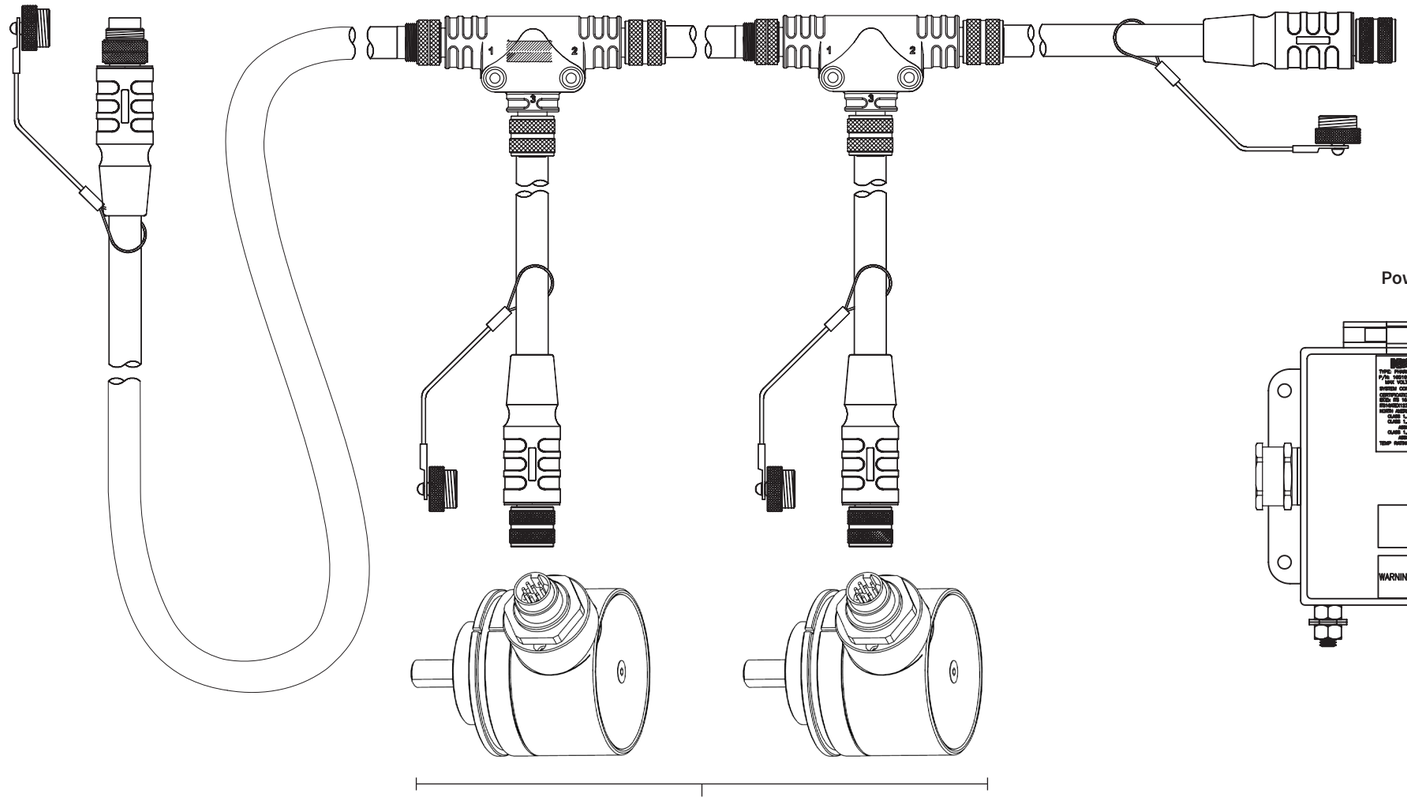
Each radio node comes equipped with one unamplified transceiver and one amplified transceiver for additional range. If even more range is needed, flash an additional radio node with Repeater™ software and insert as many repeaters as needed to make sure the signal is strong. Each radio node contains internal low-power sensors, including two 3-axis accelerometers, a 3-axis gyroscope, a temperature sensor, a primary battery fuel gauge, and a proximity sensor on each face of the device. It also has an external connector with a multi-functional GPIO and the ability to power and communicate with external sensors on the RS485 BUS.

Radio Node



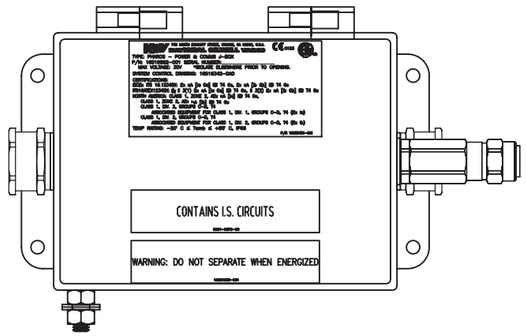
Battery Pack





OR

Power & Communications J-Box



Sensor BUS

rig@nov.com nov.com

Pharos™ - Intrinsically Safe Wireless Data Acquisition (DAQ) System - Sheet 2 of 2

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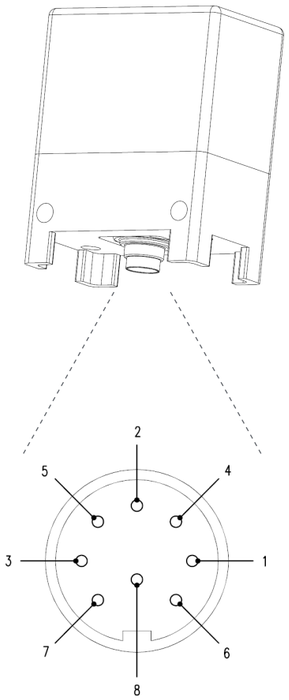
Radio Node



Pinout

1	Battery Return
2	GPIO
3	RS485 BUS HI
4	Battery Power (+3.6V)
5	Sensor Power (+5V)
6	Sleep
7	RS485 BUS LO
8	Shield

Technical Specifications

DEVICE	MIN	NOMINAL	MAX	UNITS	DESCRIPTION
BATTERY PACK	-	-	-	deg C	Intrinsically Safe Battery Pack, IP 67, -40 to +60 deg
Voltage Output	-	3.6	3.9	V	Voltage output of battery pack
Current Output	320	-	625	mA	Current trip value of active circuit. Min trip occurs @ 3.9V, max occurs @ 2V
Power Output	1.25	-	1.4	W	Power trip value of active circuit. Min trip occurs @ 2V, max occurs at 3V
Capacity	-	-	19	A-hr	Battery Pack Capacity. Max occurs @ 8 mA load, 23 degrees C. Consult NOV engineering for battery life calculations
RADIO NODE	-	-	-	deg C	Transceiver/Sensor Combination, IP67, -40 to +60
Voltage Input	2	3.6	5.5	V	Required input voltage to Radio Node
Voltage Output	4.82	5	5.13	V	Voltage output of TPS61222 on pin 5, used to power sensor BUS
Current Output	-	-	100	mA	Current output of TPS61222 on pin 5, used to power sensor BUS
ADXL362 Range	+/- 2	-	+/- 8	g	Range of ADXL362 digital MEMs 3-axis accelerometer, 12-bit resolution
ADXL362 Data Rate	12.5	-	400	Hz	Sample and data output rate of ADXL362
ADXL375 Range	-	+/- 200	-	g	Range of ADXL375 digital MEMs 3-axis accelerometer, 13-bit resolution
ADXL375 Data Rate	0.1	-	3200	Hz	Sample and data output rate of ADXL375
FXAS21002C Range	+/- 250	-	+/- 2000	deg/s	Range of FXAS2100C digital MEMs 3-axis gyroscope, 16-bit resolution
Temperature Sensor	-40	-	125		Range of temperature sensing
Transmit Frequency	2.405	-	2.48	GHz	Transmission frequencies of MRF24J40MA/D, 802.15.4, 16 channels, 5MHz BW
Transmit Power	-	0	-	dBm	Transmission power of MRF24J40MA
	-	19	-	dBm	Transmission power of MRF24J40MD
ENCODER	-	-	-	-	Low Power, Absolute, Multi-Turn Encoder
Voltage Input	3.3	5	6.5	V	Required input voltage to encoder
Current Input	-	10	-	mA	Typical supply current
Resolution	-	-	1024	ppr	Encoder angular resolution, 10-bit
Turns Rollover	-	-	65,536	revs	Total turns before rollover
POWER & COMMUNICATIONS J-BOX	-	-	-	-	-001 version contains power supply and GM International D1061 Barrier -002 version contains only power barrier
Voltage Input	20	24	40 (-001) 30 (-002)	V	Input Voltage to Power & Communications J-Box
Voltage Output	4.95	5	5.491	V	Output voltage of power barrier
Current Input	-	50	-	mA	Typical supply current
Current Output	-	342	-	mA	Trip current of power barrier
Power Output	-	1.2	-	W	Trip power of power barrier

Hazardous Location Specifications

DEVICE	ENTITY PARAMETERS	MARKINGS
RADIO NODE	For all configs: U_o = 6.51 V, P_i = P_o = 1.5 W, C_i = 130.93 uF, L_i = 17.11 uH When powered by Battery Pack: In Zone 0: U_i = 3.9 V, I_o = I_i = 5.046 A, C_o = 92.68 uF, L_o=18.29 uH In Zone 1: U_i = 3.9 V, I_o = I_i = 0.409 A, C_o = 353.18 uF, L_o=312.59 uH When powered by Power & Comms J-Box (-001) In Zone 0: U_i = 5.497 V, I_o = I_i = 1.306 A, C_o = 193.63 uF, L_o= 27.71 uH In Zone 1: U_i = 5.497 V, I_o = I_i = 0.567 A, C_o = 193.63 uF, L_o= 27.71 uH When powered by Power & Comms J-Box (-002) In Zone 0: U_i = 5.497 V, I_o = I_i = 1.081 A, C_o = 193.63 uF, L_o= 27.71 uH	IECEx: IECEx ETL 17.0002X: Ex ia [ia] IIB T4 Ga Ex ib [ib] IIB T4 Gb -40°C ≤ T_amb ≤ +60°C IP67 ATEX: ITS17ATEX201639X II 1 (1) G Ex ia [ia] IIB T4 Ga II 2 (2) G Ex ib [ib] IIB T4 Gb North America: Class 1, Zone 0, AEx ia IIB T4 Ga Class 1, Zone 1 AEx ib IIB T4 Gb Class 1, Division 1, Groups C-D, T4, Ex ia Class 1, Division 2, Groups C-D, T4, Ex ib
BATTERY PACK	When used in Zone 0: U_o = 3.9 V, I_o = 5.046 A, P_o = 1.45 W, C_o = 223.61 uF, L_o = 35.4 uH When used in Zone 1: U_o = 3.9 V, I_o = 0.409 A, P_o = 1.45 W, C_o = 484.11 uF, L_o = 329.7 uH	
ENCODER	U_i = 6.51 V, I_i = 5.046 A, P_i = 1.625 W, C_i = 34.45 uF, L_i = 0 uH	IECEx: IECEx ETL 17.0002X: Ex ia IIB T4 Ga -40°C ≤ T_amb ≤ +60°C IP67 ATEX: ITS17ATEX201639X II 1 G Ex ia IIB T4 Ga North America: Class 1, Zone 0, AEx ia IIB T4 Ga Class 1, Division 1, Groups C-D, T4, Ex ia

POWER & COMMUNICATIONS J-BOX	For (-001) when outputting to Zone 0:
	U_o = 5.497 V, I_o = 1.306 A, P_o = 1.5 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-001) when outputting to Zone 1:
	U_o = 5.497 V, I_o = 0.567 A, P_o = 1.5 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-002) when outputting to Zone 0:
	U_o = 5.497 V, I_o = 1.081 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH
	For (-002) when outputting to Zone 1:
	U_o = 5.497 V, I_o = 0.342 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH
		IECEx:
		IECEx ETL 17.0002X: Ex nA [ia Ga] IIB T4 Gc
		Ex nA [ib Gb] IIB T4 Gc
		-40°C≤T_amb≤+60°C(-002)
		-20°C≤T_amb≤+55°C (-001)
		IP67
		
		ATEX:
		ITS17ATEX201639X
		II 3 (1) G Ex nA [ia Ga] IIB T4 Gc
		II 3 (2) G Ex nA [ib Gb] IIB T4 Gc
		
		North America:
		Class 1, Zone 2, AEx nA [ia Ga] IIB T4 Gc
		Class 1, Zone 2, AEx nA [ib Gb] IIB T4 Gc
		Class 1, Div. 2, Groups C-D, T4
		Associated Equip. Class 1, Div 1, Groups C-D, T4, (Ex ia)
		Class 1, Div. 2, Groups C-D, T4
		Associated Equip. Class 1, Div 2, Groups C-D, T4, (Ex ib)

POWER BARRIER	When outputting to Zone 0: U_o = 5.497 V, I_o = 1.081 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH When outputting to Zone 1: U_o = 5.497 V, I_o = 0.342 A, P_o = 1.285 W, C_o = 324.56 uF, L_o = 44.82 uH	IECEx: IECEx ETL 17.0002X: Ex nA [ia Ga] IIB T4 Gc Ex nA [ib Gb] IIB T4 Gc -40°C≤T_amb≤+60°C(-002) ATEX: ITS17ATEX201639X II 3 (1) G Ex nA [ia Ga] IIB T4 Gc II 3 (2) G Ex nA [ib Gb] IIB T4 Gc North America: Class 1, Zone 2, AEx nA [ia Ga] IIB T4 Gc Class 1, Zone 2, AEx nA [ib Gb] IIB T4 Gc Class 1, Div. 2, Groups C-D, T4 Associated Equip. Class 1, Div 1, Groups C-D, T4, (Ex ia) Class 1, Div. 2, Groups C-D, T4 Associated Equip. Class 1, Div 2, Groups C-D, T4, (Ex ib)