

# ***Technical Data Sheet TDS-003***

## ***IntelliSense Output Options***

### **RS-485**

An RS-485 digital output is an option with the IntelliSense diagnostic monitoring system. This system is a two-wire, bi-directional communication system, which is used to support instrumentation and control functions. The relatively low voltage output signal is generally considered intrinsically safe. With special software supplied by Chempump, the host computer or distributed control system (DCS) can send instructions to or request data from the pump mounted module, and the IntelliSense can respond over the same lines. A significant advantage of the RS-485 system is that data can be transmitted long distances (up to 4,000 ft.). Also, up to 31 pump modules can be monitored over the same pair of wires since each pump installation has its own unique address. Setting the address is accomplished by setting dip switches located inside the NEMA 4X IntelliSense module housing.

Accessing a Chempump equipped with the IntelliSense diagnostic monitoring system from a host computer, or DCS, allows real time data to be available for diagnostic trending, and predictive maintenance. Not only can the host receive blocks of data from the IntelliSense monitor, but the host can also download information and instructions to the IntelliSense module. Chempump can provide the communication protocols required by existing control systems to exactly meet user requirements.

### **Multiple Pump Outputs**

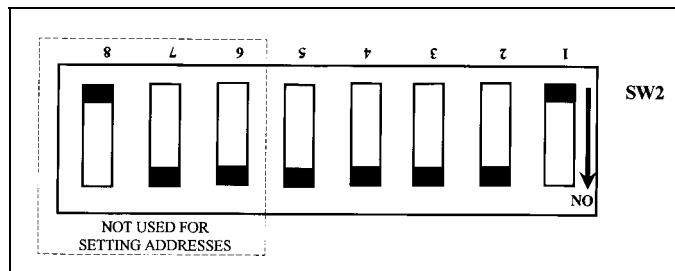
Up to 31 can be accessed over a single pair of wires by a single host. Each pump is given a unique address for bi-directional communication. When an RS-485 output is being used, Switch #7 located on SW2 must be in the “ON” position. If more than one monitor is being used with a single line parallel connection, only one Switch #7 on the IntelliSense that is at the end of the wire run should be in the “ON” position. All other monitors should have Switch #7 in the “OFF” position.

### **Setting an RS-485 Address**

Setting the address for individual pumps is accomplished by setting a binary number using the first five switches located on SW2, located on the IntelliSense circuit board. When a switch is in the “ON” (down) position this is a binary zero(0). When a switch is in the “OFF” (up) position this is a binary one(1). See *Table 1 for Binary Code Sequence*, and *Figure 1 for Dipswitch*.

DIP SWITCH	ADDRESS	DIP SWITCH	ADDRESS	DIP SWITCH	ADDRESS
00001	#1	01100	#12	10111	#23
00010	#2	01101	#13	11000	#24
00011	#3	01110	#14	11001	#25
00100	#4	01111	#15	11010	#26
00101	#5	10000	#16	11011	#27
00110	#6	10001	#17	11100	#28
00111	#7	10010	#18	11101	#29
01000	#8	10011	#19	11110	#30
01001	#9	10100	#20	11111	#31
01010	#10	10101	#21		
01011	#11	10110	#22		

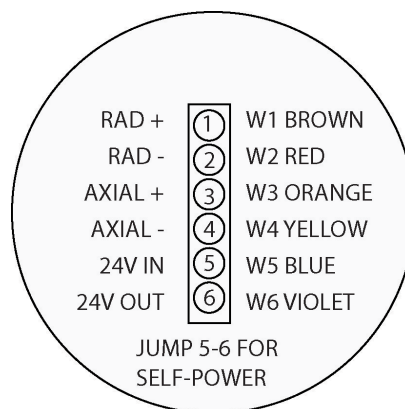
**Table 1**



**Figure 1**

### **4-20mA**

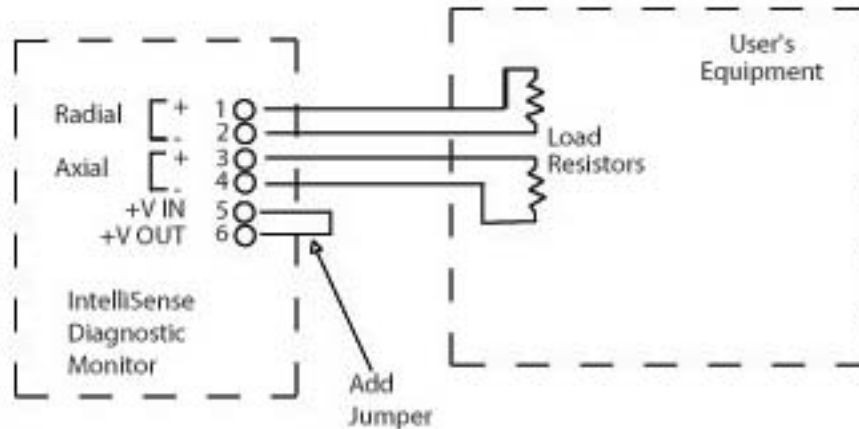
Two basic connection variations are available with Chempump's 4-20mA output loop. Please refer to Figure 2 for terminal strip details.



**Figure 2**

## Self-Powered

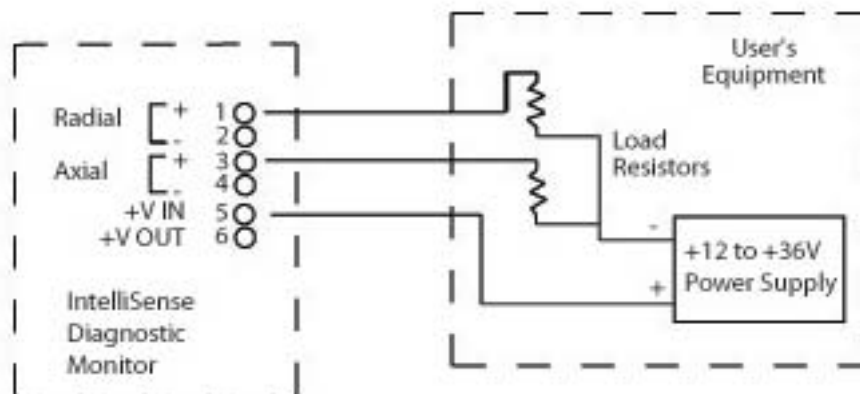
The 4-20mA device is a self powered device that sends out a current from 4mA to 20mA into a user's load resistance. The normal internal supply voltage is nominally 24Volt DC. The maximum load resistance of the loop is 500 ohms, resulting in a 10 Volt drop at maximum current. Two wires are required for each channel. *Please see Figure 3.*



**Figure 3**

## Loop Power from User

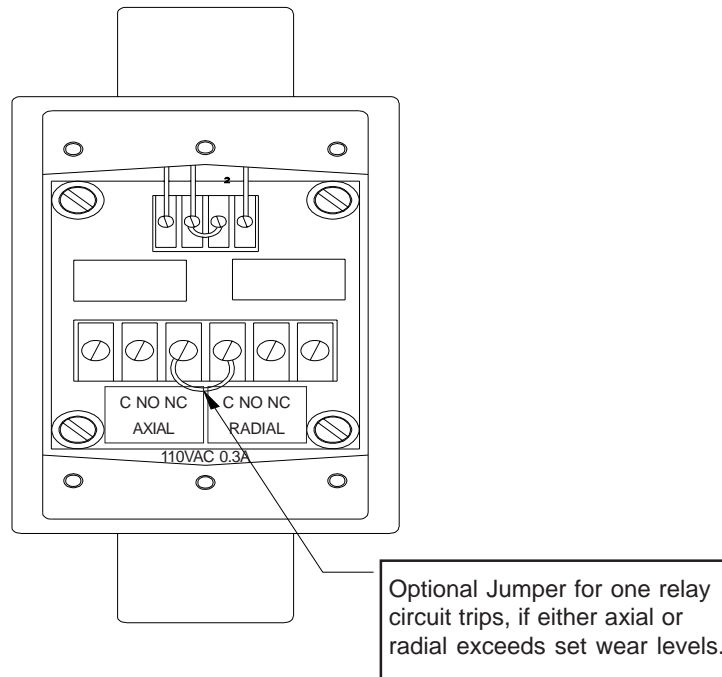
The 4-20mA device draws its loop power from the user. The user's power can vary from 12 Volt DC to 36 Volt DC. The device sends out a current from 4mA to 20mA into the user's load resistance. The maximum load resistance of the loop is  $(\text{User's voltage} - 12) \times 50$  ohms. For example, at a voltage of 24 Volts DC from the user, the maximum loop load resistance is  $(24 - 12) \times 50$ , or 600 ohms. Three wires are required. *Please refer to Figure 4.*



**Figure 4**

## Relay Contacts

The IntelliSense relay option output is provided through a separate connection box attached to the side of the main IntelliSense box. The relays contained therein trip when the IntelliSense unit detects bearing wear greater than 50%. Two pilot-duty relays (one for axial, the other for radial wear) provide output. Each can be part of a normally open or normally closed control circuit (a wear indication would close the circuit or open the circuit, respectively). To have a normally open circuit close when the axial wear limit is exceeded connect the circuit to the terminals labeled “C” and “NO” above the “AXIAL” marking. To connect a normally closed circuit to energize with axial wear, connect to the “C” and “NC” terminals above the “AXIAL” marking. A separate circuit should be connected to the “RADIAL” terminals in like fashion. If one circuit, which will trip with either axial or radial wear extremes is desired, a jumper must be installed connecting the “C” terminal of the radial output to the “NC” terminal of the axial output. The control circuit is then connected to the “C” terminal of the axial output and to the “NC” terminal of the radial output. Voltage is limited to 110 Voltage AC and 0.3A. *Please refer to Figure 5.*



**Figure 5**

## Enclosures

Factory Mutual has approved the standard IntelliSense diagnostic monitor as intrinsically safe and rated its enclosures as NEMA 4X. Installation must be in accordance with Crane Co., Chempump Division’s instructions and the National Electric Code.

However, when an output option is provided, the IntelliSense classification is a NEMA 1. If required, Chempump can provide a NEMA 7/9 enclosure which will maintain the integrity of an explosion proof environment. When this modification has been done for your pump(s) a separate dimension drawing and wiring diagram will be included in your data package.