3283N

Demand Control Module
(Interface with Utility Pulse Meter)

3283N Demand Control Module is an interface between the Utility Companies' Demand meter and the Controller. Solidyne designed the **3283N** to provide a stable contact input to the Controller from the Utility Meter. Short duration pulses from a Utility Meter, often not detectable by a Controller, are intercepted by the **3283N** to instantaneously provide a stable and easily detected signal output to the Controller. The stability and dependability of the signal from the **3283N** helps to ensure the accuracy of the demand control.

FEATURES:

- Mercury-wetted reed relay contacts and circuitry providing stable and dependable Demand Pulse input to the Controller
- Split-bobbin transformer reducing power-line noise into **3283N** circuitry.
- Power Light Emitting Diode (LED) to indicate power to the **3283N** .
- Pulse LED to indicate a signal detected by the Utility Demand Meter.
- Attractive enclosure with **3283N** wiring instructions printed on a label on the inside cover.
- Spade type terminal connectors for easy wiring and installation.

APPLICATIONS:

- Accurate detection of dry-contact Utility Meter pulses in demand for kWh monitoring and control operations.
- Isolate and signal conditioning pulse signals prior to use by the Controller.
- Used with Meters having double-throw relays by multiplying the 3283N demand input multiplier by two.

Model: 3283N

OPERATION:

The 3283N Demand Pulse Interface unit is used to isolate and interface a utility pulse demand meter with a Solidyne Controller. After proper installation and wiring of the 3283N, certain parameters must be programmed into the controller to provide accurate demand profile, control and data gathering functions. These parameters are multiplying factor, offset and averaging period.

SPECIFICATIONS:

Electrical

Input Power: 120 VAC
Utility Meter Input: Contact Closure
Output to Controller: Contact Closure

Mechanical

Module Size:
5.75" L x 3.125" W x 1.125" D

Knock-Out Hole:
Small: 0.5" Dia.
Large: 0.75" Dia.

Environmental

INSTALLATION AND WIRING :

Caution:

Disconnect power before installing or removing Controllers, Modules, or Meters. Failure to remove power can result in injury or damage to equipment.

Obtain the Electric Utility's permission and assistance, if necessary, before attempting any connections.

INSTALLATION:

The 3283N should be mounted in a panel near the controller.
Note: Do not locate the 3283N more than 2000 feet from the controller.

WIRING:

1. Securely mount the 3283N in a convenient location near the controller.
2. Remove the 3282N cover and remove the three terminal connectors from the unit to uncover the connection writing on the circuit board.
3. Run appropriate cabling from the controller and the utility meter to the 3283N. Follow local codes pertaining to low-voltage wiring.
4. Connect the two input wires from the controller to one of the loose terminal connectors and plug the connector into the header connector on the board, labeled "DEMAND PULSE OUT TO THE CONTROLLER."
5. Connect the two input wires from the utility meter to one of the loose terminal connectors and plug the connector into the center header connector on the board, labeled "DEMAND PULSE IN FROM THE DEMAND METER."
6. 120 VAC power will be connected to the header terminal labeled "120 VAC POWER IN." CAUTION: Do NOT make any 120 VAC connections while 120 VAC power is on, the 120 VAC should be turned off prior to making any connections.
   Follow all local codes pertaining to 120 VAC wiring when running 120 VAC wires.
7. After all connections are made, apply power to the unit. When the unit is powered properly the "POWER ON" LED will light.
8. Check the unit for correct operation, then replace the 3283N cover.

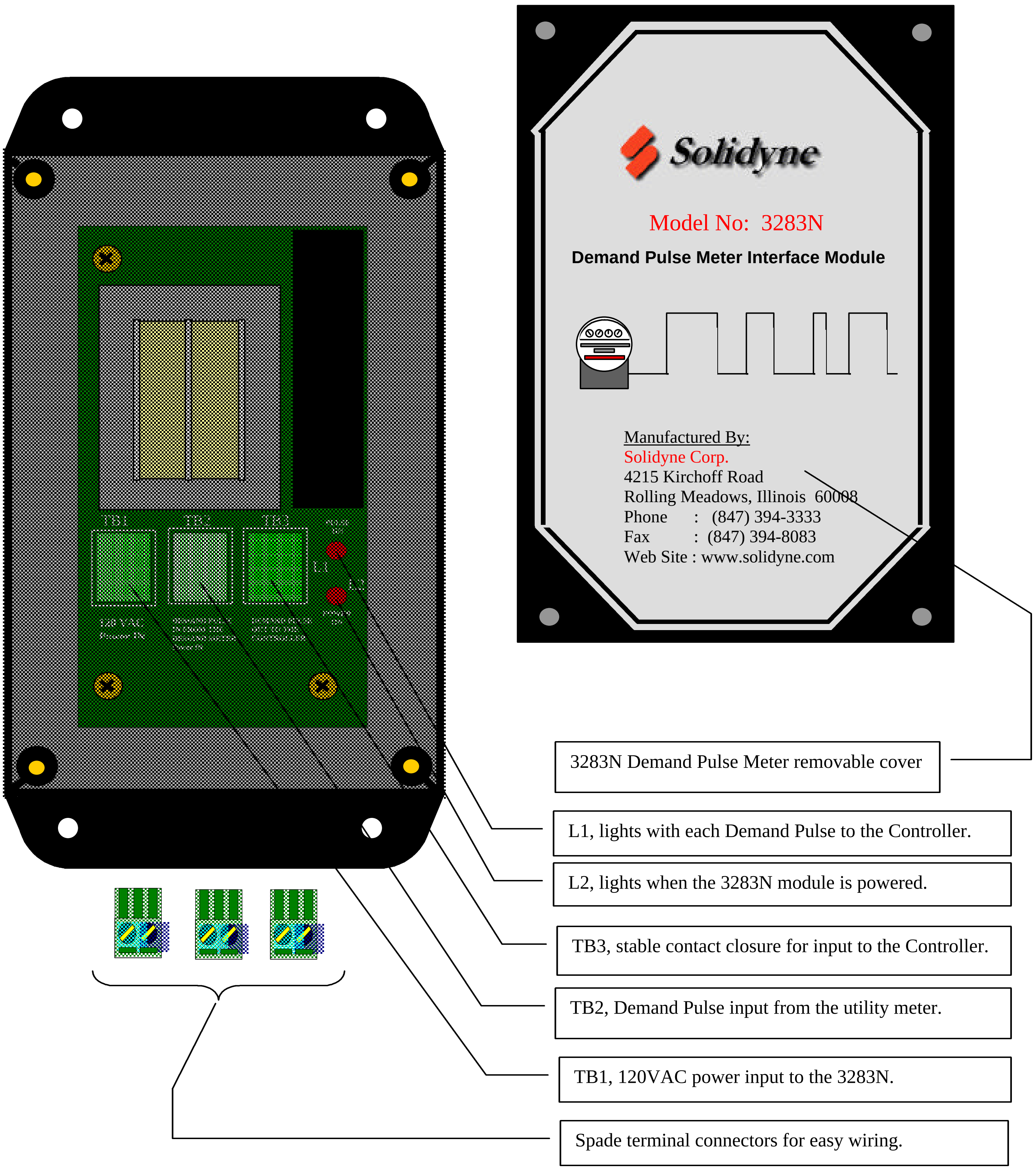


FIGURE 1: 3283N Layout

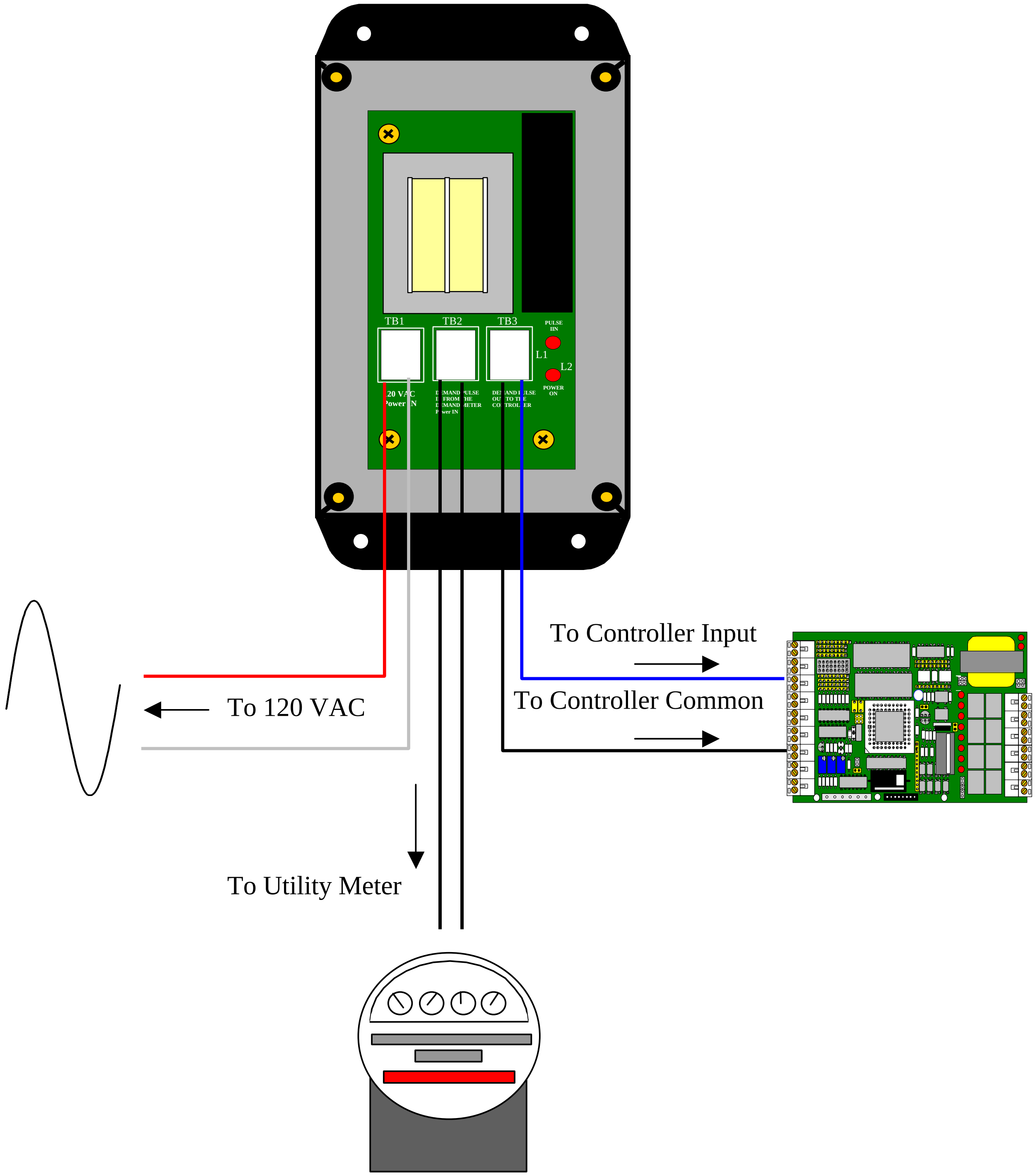


FIGURE 2: Wiring connections

IZAC PULSE Input:

The 3283N output can be connected to any available IZAC sensor input. The sensor input can be configured for TYPE: PULSE from the Sensor\Details screen from within the software (no jumper is required on the IZAC for this sensor configuration).

With a default multiplier of 0.0, offset of 0 and averaging period of 1, the PULSE input counts the number of contact closures each minute and uses the count for both the sensor's INSTANTANEOUS and AVERAGED value for the next minute. Thus, the sensor value is updated at the top of every minute and shows the number of pulses counted during the previous minute. Since the contacts will be counted over a 1-minute sliding time window, 6 contact closures made within one minute will display a 6. If no contact closures are made for one minute the display will show 0.

IZAC PULSE inputs can count a maximum of 240 pulses per minute.

Demand Multiplier and Offset:

Here are guidelines for selecting a multiplier and averaging period for PULSE inputs used in a demand application:

Most demand meters have a kWh/pulse scaling value on the meter. To find the multiplier needed to scale the meter so that 1 kW read on the meter equals 1 on the Sensor Display, use the following equation:

$$m = 60 * MS$$

where,

m = Sensor Multiplier
MS = Meter Scale

The highest value that an IZAC sensor can display is 4095.9. If the demand is expected to exceed 4095, the calculated Sensor Multiplier should be scaled to a lower value (e.g., a multiplier of 21.6, could be divided by 10 to produce 2.16. Thus, a 4000 kW power consumption rate would produce a sensor value of 400).

Most demand meters use a 15 or 30 minute window for measuring peak kWh. To use an IZAC for demand-limiting applications where short peaks, much less than the meter window, may occur the averaging period of 3 to 5 minutes should be used. This prevents a short peak in demand from causing a "spike" in the sensor value, which in turn would throw the program into shed prematurely. The averaging period shouldn't be set to the same value as the meter's window, that would cause the sensor value to lag a jump in demand so much that the program wouldn't go into shed until it's too late. The following equation shows how the averaging period affects a sensor's value:

$$[(AP - 1) * (PSVC) + (LMSV)] / AP$$

where,

AP = Average Period
PSVC = Previous Sensor Value Calculated
LMSV = Last Minute's Sensor Value.

For example, with an averaging period of 5 where the sensor value jumps from 100 to 200 and holds at 200, the sequence of averaged sensor values would be:

100.0 ← Value at start

120.0	136.0	148.8	159.0	167.2	173.8
179.0	183.2	186.6	189.2	191.4	193.1
194.5	195.6	196.5	197.2	197.8	198.2
198.6	198.9	199.1	199.2	199.4	199.5
199.6	199.7	199.7	199.8	199.9	199.9
199.9	199.9	199.9			

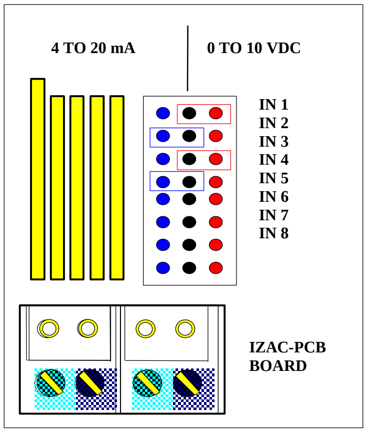
After 5-minute averaging → 200.0

As can be seen from this sequence, a small averaging period produces a rather long smoothing function. With a 5-minute averaging period, it takes 8 minutes to reach 90% of the final value, 18 minutes to reach 99% of the final value and 34 minutes to reach the final value.

For very slow pulse rates (0 to 3 pulses per minute) an averaging period of 3 to 5 is desirable to keep the averaged sensor value from dropping to 0 and/or bouncing around too much.

Steps for Configuring Pulsed IZAC Inputs:

1. Remove the sensor jumpers on the IZAC so the PULSE sensor input is configured as a thermistor.



NOTES :

No Jumper : Thermistor
Jumper to Left : 4-20 mA
Jumper to Right : 0-10 VDC

FIGURE 3: IZAC Jumpers

2. Configure the Sensor/Details screen in the Solidyne software for a TYPE: PULSE input for the corresponding sensor.
3. Calculate the multiplier using the meter's scaling value. For example, a meter scaled to 0.36 kWh/Pulse would have a multiplier of:

$$m = \left(\frac{0.36 \text{ kWh}}{\text{Pulse}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right) * \left(\frac{1 \text{ Pulse}}{\text{minute}}\right) = 21.62 \text{ kW}$$

Note that "h" in "kWh" is cancelled by "hour" in "60 minutes/hour." "Minutes" and "Pulse," likewise, are cancelled by appearing in both numerator and denominator. "kW" is the only unit left. Thus, the multiplier of 21.62 produces a sensor value in kW.

4. Select the desired averaging period in the sensor details.