

Input: 0-10 mV to 0-130 VDC, ±5 mVDC to ±65 VDC, 0-200 µA to 0-50 mADC (Sink or Source)
Output: 0-1 V to 0-10 VDC, ±5 VDC, ±10 VDC, 0-2 mA to 4-20 mA (Sink or Source)

Quick Link: api-usa.com/4380

- One Minute Setup for Hundreds of I/O Ranges
- External Switches & Tables for Range Selection
- Zero and Span Output Calibration Potentiometers
- Full 1200 V Input/Output/Power Isolation
- Input and Output LoopTracker® LEDs
- Output Test Button
- Built-In Loop Power Supplies for Sink/Source I/O

Applications

- Convert, Boost, and Rescale Process Signals
- Isolate Single-Ended (Common Ground) PLC Inputs
- Interface Process Signals with Panel Meters, PLCs, Recorders, Data Acquisition, DCS, & SCADA Systems

DC Input Ranges

Field selectable ranges and offsets via switch settings
 Voltage: 0-10 mVDC to 0-130 VDC
 Bipolar voltage: ±5 mVDC to ±65 VDC
 Current: 0-200 µADC to 0-50 mADC
 Input offset: ±100% in 15% increments

Input Impedance (Voltage)

Voltage: 1 MΩ minimum
 Current: 50 Ω typical
 Voltage burden: 1 VDC at 20 mA current input

Common Mode Rejection

100 dB minimum

Input Loop Power Supply

15 VDC ±10%, regulated, 25 mADC
 May be selectively wired for sinking or sourcing mA input

LoopTracker

Variable brightness LEDs indicate I/O loop level and status

DC Output Ranges

Field selectable ranges and offsets via switch settings
 Voltage (10 mA max): 0-1 VDC to 0-10 VDC
 Bipolar voltage: ±5 VDC or ±10 VDC
 Current: 0-2 mADC to 0-20 mADC, 4-20 mADC
 20 V compliance, 1000 Ω at 20 mA

Output Calibration

Multi-turn zero and span potentiometers
 ±15% of span adjustment range typical

Output Loop Power Supply

20 VDC nominal, regulated, 25 mADC, <10 mVRMS max. ripple
 May be selectively wired for sinking or sourcing mA output

Output Test/Override

Front button sets output to test level when pressed or via external contact closure
 Potentiometer adjustable 0-100% of span

Output Ripple and Noise

Less than 10 mVRMS ripple and noise

Linearity

Better than ±0.1% of span

Ambient Temperature Range and Stability

-10°C to +60°C operating ambient
 Better than ±0.02% of span per °C stability

Response Time

Standard: 70 milliseconds nominal
 DF option: 1 millisecond nominal. Output noise levels will be greater than standard specifications. Consult factory.

Isolation

1200 VRMS minimum
 Full isolation: power to input, power to output, input to output

Housing and Connectors

IP 40, requires installation in panel or enclosure
 For use in Pollution Degree 2 Environment
 Mount vertically to a 35 mm DIN rail
 Four 4-terminal removable connectors, 14 AWG max wire size

Power

85-265 VAC, 50/60 Hz or 60-300 VDC, 2 W maximum
 D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 2 W maximum

Dimensions

0.89" W x 4.62" H x 4.81" D
 22.5 mm W x 117 mm H x 122 mm D
 Height includes connectors



Applications Link
api-usa.com/apps

Free Factory I/O Setup!



Connect Sink or Source mA Output 1 2 3 4

Removable Plugs

Adjustable Output Offset 5 6 7 8

Output LoopTracker LED

Adjustable Output Test/Override Function

Zero and Span for Output

Input LoopTracker LED

Hundreds of Range Selections

Connect Sink or Source mA Input 9 10 11 12

Universal Power 13 14 15 16

See Wiring Diagrams on Next Page

Description

The APD 4380 accepts a DC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input.

Typical applications include signal isolation, conversion, boosting or a combination of the three. Full 3-way isolation (input, output, power) makes this module useful for ground loop elimination, common mode signal rejection or noise pickup reduction.

I/O Sink/Source Versatility

Standard on the APD 4380 is a 15 VDC loop excitation supply for the input and a 20 VDC loop excitation supply for the output. These power supplies can be used to power passive mA devices if required.

For maximum versatility the input and output can each be selectively wired for sinking or sourcing. This allows the APD 4380 to work with any combination of powered or unpowered mA inputs and powered or unpowered mA outputs.

How to Order

All models are field rangeable. Please specify

Model APD 4380
 Order APD 4380 D for operation on low voltage power
 Options as required

LoopTracker

API exclusive features include two LoopTracker LEDs (green for input, red for output) that vary in intensity with changes in the process input and output signals. These provide a quick visual picture of your process loop at all times and can greatly aid in saving time during initial startup and/or troubleshooting.

Output Test

An API exclusive feature includes the test button to provide a fixed output (independent of the input) when held depressed. The test output level is potentiometer adjustable from 0 to 100% of output span.

The output test button greatly aids in saving time during initial startup and/or troubleshooting.

I/O can be pre-set to your specifications. Please provide

Input range
 Output range

Model	Input	Output	Power
APD 4380	Field configurable—specify range if factory is to set switches	Field configurable—specify range if factory is to set switches	85-265 VAC 60-300 VDC
APD 4380 D			9-30 VDC or 10-32 VAC

Options—add to end of model number

- R Input/output reversal, such as 4-20 mA input to 20-4 mA output
- DF Fast response time, 1 millisecond nominal or consult factory.
- U Conformal coating for moisture resistance

Accessory—order as separate line item

API BP4 Spare removable 4 terminal plug, black

Precautions

WARNING! All wiring must be performed by a qualified electrician or instrumentation engineer. See diagram for terminal designations and wiring examples. Consult factory for assistance.

WARNING! Avoid shock hazards! Turn signal input, output, and power off before connecting or disconnecting wiring, or removing or installing module.

Précautions

ATTENTION! Tout le câblage doit être effectué par un électricien ou ingénieur en instrumentation qualifié. Voir le diagramme pour désignations des bornes et des exemples de câblage. Consulter l'usine pour assistance.

ATTENTION! Éviter les risques de choc! Fermez le signal d'entrée, le signal de sortie et l'alimentation électrique avant de connecter ou de déconnecter le câblage, ou de retirer ou d'installer le module.

API maintains a constant effort to upgrade and improve its products. Specifications are subject to change without notice. See api-usa.com for latest product information. Consult factory for your specific requirements.

WARNING: This product can expose you to chemicals including nickel, which is known to the State of California to cause cancer or birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Electrical Connections

See wiring diagrams. Observe polarity.

* Do not make any connections to unused terminals or use them as wiring junctions for external devices. This may cause permanent damage to the module!

Range Selection

See the tables on the next two pages to select I/O ranges for your application. The module side label also lists common ranges. It is generally easier to select ranges before installation.

See the model/serial number label for module information, options, or if a custom range was specified.

For ranges that fall between the listed ranges use the next highest setting and trim the output signal with the zero and span potentiometers.

- Switches A and B: Input range
- Switch C: Input offset
- Switch D: Output range
- Switch E: Set to "V" for voltage output or set to "I" for current output

Note that when using a current shunt input, it measures a mV drop across a fixed resistance, typically 50 mV, 75 mV or 100 mV. The correct input setting would be the appropriate mV range for the shunt.

Electrical Connections

Polarity must be observed for input and output wiring connections. If the input and/or output do not function, check switch settings and wiring polarity.

Voltage Output

Set switch E to "V" for a voltage output.

If your receiving device (such as a PLC or a display) uses a voltage input, use terminals 3 and 4.

Current Output

Set switch E to "I" for a current output.

Determine if your receiving device (such as a PLC or a display) provides power to the current loop or if the loop must be powered by the APD module. Typical voltage may be 9-24 VDC at your device's input terminals if it provides power to the loop.

If your device does not power the current loop, the APD can provide power using terminals 3 and 4.

If it provides power to the loop or an external supply provides power to the loop, use terminals 2 and 3.

Type of Device for Output	- Terminal	+ Terminal
Measuring/recording device accepts a voltage input.	3 (-)	4 (+) switch E set to "V"
Measuring/recording device accepts a mA (current) input and the input is unpowered or passive. APD module provides the loop power.	3 (-)	4 (+20 V) switch E set to "I"
Measuring/recording device accepts a mA (current) input and provides power to the current loop.	2 (-)	3 (+) switch E set to "I"

Current Input

Determine if your transmitter provides power to the current loop or if the loop must be powered by the APD module. Typical voltage may be 9-24 VDC at your transmitter's output terminals if it provides power to the loop.

If your transmitter or an external supply provides power to the loop, use terminals 9 and 11 as shown below right.

If your transmitter does not power the current loop, the APD can provide power using terminals 10 and 11 as shown far right.

Voltage Input

If your transmitter provides a voltage output, use terminals 9 and 11 as shown at right.

Type of Input Device	- Terminal	+ Terminal
Sensor or transmitter with a voltage output.	9 (-)	11 (+)
Transmitter with a mA (current) output that provides power to the current loop. Typically a 3 or 4-wire device.	9 (-)	11 (+)
Transmitter with mA (current) output that is unpowered. Typically a 2-wire device. APD module provides loop power.	11 (-)	10 (+15 V)

Module Power

Check model/serial number label for module operating voltage to make sure it matches available power.

When using DC power, either polarity is acceptable, but for consistency with similar API products, positive (+) can be wired to terminal 13 and negative (-) can be wired to terminal 16.

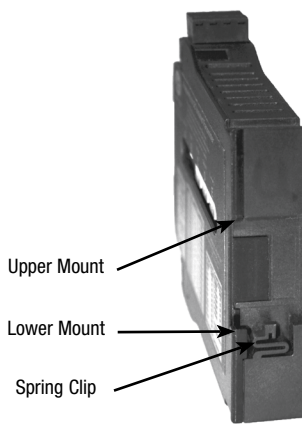
Installation Location

The housing clips to a standard 35 mm DIN rail. The housing is IP40 rated and should be mounted inside a panel or enclosure.

Mounting to a DIN Rail

Install module vertically on a 35 mm DIN rail in a protective enclosure away from heat sources. Do not block air flow. Allow 1" (25 mm) above and below housing vents for air circulation.

1. Tilt front of module downward and position against DIN rail.
2. Clip lower mount to bottom edge of DIN rail.
3. Push front of module upward until upper mount snaps into place.



Removal

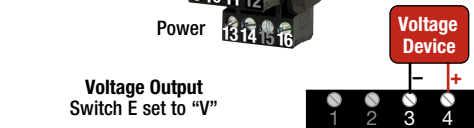
1. Push up on the bottom back of the module.
2. Tilt front of module downward to release upper mount from top edge of DIN rail.
3. The module can now be removed from the DIN rail.

* Do not make connections to unused terminals!



* Do not make connections to unused terminals!

Wire terminal torque
0.5 to 0.6 Nm or
4.4 to 5.3 in-lbs

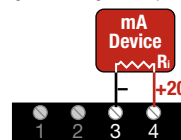


mA output: determine if receiving device has a passive or powered input. The module can be wired for a sinking or sourcing mA output.

Current Sourcing Output

Switch E set to "I"

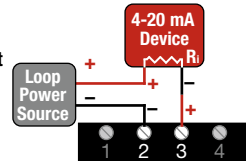
Module powers mA output loop



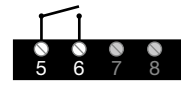
Current Sinking Output

switch E set to "I"

Module mA output is unpowered

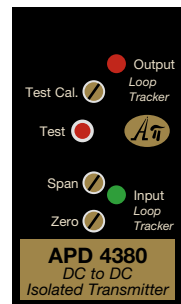


External Contact for Test Function



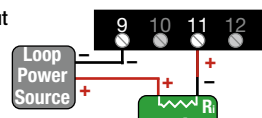
To maintain full isolation avoid combining power supplies in common with input, output, or unit power.

Voltage Input



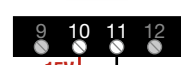
Current Sinking Input

Module mA input is unpowered

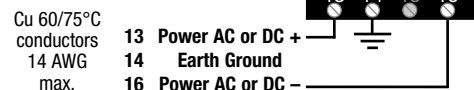


Current Sourcing Input

Module powers mA input loop



mA input: determine if transmitter has a passive or powered output. The module can be wired for a sinking or sourcing mA input.

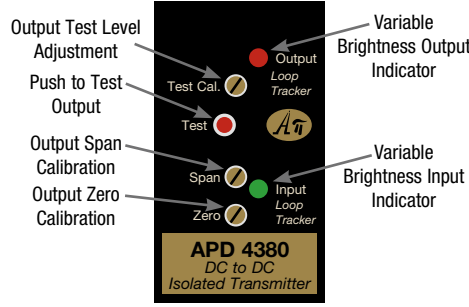


Calibration

Input and output ranges, if specified on your order, are factory pre-configured (at 24°C ±1°C). Front-mounted Zero and Span potentiometers are used to calibrate the output to compensate for load and lead variations.

Note: Perform the following calibration procedure any time switch settings are changed.

1. Apply power to the module and allow a minimum 20 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal. For example: 4 mA for a 4-20 mA output or -10 V for a ±10V output.
4. Set the input at maximum and adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal. Example: for 4-20 mA output, the Span control will provide adjustment for the 20 mA or high end of the signal.
5. Repeat adjustments for maximum accuracy.



Operation

The APD 4380 accepts a DC voltage or current input and provides an optically isolated DC voltage or current output that is linearly related to the input.

The green LoopTracker® input LED provides a visual indication that a signal is being sensed by the input circuitry of the module. It also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum. If the LED fails to illuminate, or fails to change in intensity as the process changes, check the module power or signal input wiring. Note that it may be difficult to see the LEDs under bright lighting conditions.

The red LoopTracker output LED provides a visual indication that the output signal is functioning. It becomes brighter as the input and the corresponding output change from minimum to maximum.

For current outputs, the red LED will only light if the output loop current path is complete. For either current or voltage outputs, failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.

Output Test Function

When the Test button is depressed it will drive the output with a known good signal that can be used as a diagnostic aid during initial start-up or troubleshooting. When released, the output will return to normal.

The Test Cal. potentiometer is factory set to approximately 50% output. It can be adjusted to set the test output from 0 to 100% of the output span. Press and hold the Test button and adjust the Test Cal. potentiometer for the desired output level.

Output	0-1 V	0-2 V	0-4 V	1-5 V	0-5 V	0-8 V	2-10 V	0-10 V	±5 V	±10 V	0-2 mA	0-4 mA	0-8 mA	2-10 mA	0-10 mA	0-16 mA	4-20 mA	0-20 mA
Switches	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE	ABCDE
Input	AB CDE	ABC DE	AB CDE	ABC DE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE	AB CDE
0-10 mV	0300V	0308V	0301V	0306V	0309V	0302V	0307V	0303V	0304V	0305V	0300I	0308I	0301I	0306I	0309I	0302I	0307I	0303I
0-20 mV	0700V	0708V	0701V	0706V	0709V	0702V	0707V	0703V	0704V	0705V	0700I	0708I	0701I	0706I	0709I	0702I	0707I	0703I
0-40 mV	1300V	1308V	1301V	1306V	1309V	1302V	1307V	1303V	1304V	1305V	1300I	1308I	1301I	1306I	1309I	1302I	1307I	1303I
0-50 mV	0B00V	0B08V	0B01V	0B06V	0B09V	0B02V	0B07V	0B03V	0B04V	0B05V	0B00I	0B08I	0B01I	0B06I	0B09I	0B02I	0B07I	0B03I
0-80 mV	1700V	1708V	1701V	1706V	1709V	1702V	1707V	1703V	1704V	1705V	1700I	1708I	1701I	1706I	1709I	1702I	1707I	1703I
0-100 mV	0100V	0108V	0101V	0106V	0109V	0102V	0107V	0103V	0104V	0105V	0100I	0108I	0101I	0106I	0109I	0102I	0107I	0103I
0-130 mV	3300V	3308V	3301V	3306V	3309V	3302V	3307V	3303V	3304V	3305V	3300I	3308I	3301I	3306I	3309I	3302I	3307I	3303I
0-160 mV	9300V	9308V	9301V	9306V	9309V	9302V	9307V	9303V	9304V	9305V	9300I	9308I	9301I	9306I	9309I	9302I	9307I	9303I
0-200 mV	0500V	0508V	0501V	0506V	0509V	0502V	0507V	0503V	0504V	0505V	0500I	0508I	0501I	0506I	0509I	0502I	0507I	0503I
0-250 mV	0A00V	0A08V	0A01V	0A06V	0A09V	0A02V	0A07V	0A03V	0A04V	0A05V	0A00I	0A08I	0A01I	0A06I	0A09I	0A02I	0A07I	0A03I
0-260 mV	3700V	3708V	3701V	3706V	3709V	3702V	3707V	3703V	3704V	3705V	3700I	3708I	3701I	3706I	3709I	3702I	3707I	3703I
0-320 mV	9700V	9708V	9701V	9706V	9709V	9702V	9707V	9703V	9704V	9705V	9700I	9708I	9701I	9706I	9709I	9702I	9707I	9703I
0-400 mV	1100V	1108V	1101V	1106V	1109V	1102V	1107V	1103V	1104V	1105V	1100I	1108I	1101I	1106I	1109I	1102I	1107I	1103I
0-500 mV	0000V	0008V	0001V	0006V	0009V	0002V	0007V	0003V	0004V	0005V	0000I	0008I	0001I	0006I	0009I	0002I	0007I	0003I
0-520 mV	B300V	B308V	B301V	B306V	B309V	B302V	B307V	B303V	B304V	B305V	B300I	B308I	B301I	B306I	B309I	B302I	B307I	B303I
0-650 mV	3B00V	3B08V	3B01V	3B06V	3B09V	3B02V	3B07V	3B03V	3B04V	3B05V	3B00I	3B08I	3B01I	3B06I	3B09I	3B02I	3B07I	3B03I
0-800 mV	1500V	1508V	1501V	1506V	1509V	1502V	1507V	1503V	1504V	1505V	1500I	1508I	1501I	1506I	1509I	1502I	1507I	1503I
0-1 V	0400V	0408V	0401V	0406V	0409V	0402V	0407V	0403V	0404V	0405V	0400I	0408I	0401I	0406I	0409I	0402I	0407I	0403I
0-1.04 V	B700V	B708V	B701V	B706V	B709V	B702V	B707V	B703V	B704V	B705V	B700I	B708I	B701I	B706I	B709I	B702I	B707I	B703I
0-1.3 V	3100V	3108V	3101V	3106V	3109V	3102V	3107V	3103V	3104V	3105V	3100I	3108I	3101I	3106I	3109I	3102I	3107I	3103I
0-1.6 V	9100V	9108V	9101V	9106V	9109V	9102V	9107V	9103V	9104V	9105V	9100I	9108I	9101I	9106I	9109I	9102I	9107I	9103I
0-2 V	1000V	1008V	1001V	1006V	1009V	1002V	1007V	1003V	1004V	1005V	1000I	1008I	1001I	1006I	1009I	1002I	1007I	1003I
0-2.5 V	0800V	0808V	0801V	0806V	0809V	0802V	0807V	0803V	0804V	0805V	0800I	0808I	0801I	0806I	0809I	0802I	0807I	0803I
0-2.6 V	3500V	3508V	3501V	3506V	3509V	3502V	3507V	3503V	3504V	3505V	3500I	3508I	3501I	3506I	3509I	3502I	3507I	3503I
0-3.2 V	9500V	9508V	9501V	9506V	9509V	9502V	9507V	9503V	9504V	9505V	9500I	9508I	9501I	9506I	9509I	9502I	9507I	9503I
0-3.25 V	3A00V	3A08V	3A01V	3A06V	3A09V	3A02V	3A07V	3A03V	3A04V	3A05V	3A00I	3A08I	3A01I	3A06I	3A09I	3A02I	3A07I	3A03I
0-4 V	1400V	1408V	1401V	1406V	1409V	1402V	1407V	1403V	1404V	1405V	1400I	1408I	1401I	1406I	1409I	1402I	1407I	1403I
1-5 V	1490V	1498V	1491V	1496V	1499V	1492V	1497V	1493V	1494V	1495V	1490I	1498I	1491I	1496I	1499I	1492I	1497I	1493I
0-5 V	2000V	2008V	2001V	2006V	2009V	2002V	2007V	2003V	2004V	2005V	2000I	2008I	2001I	2006I	2009I	2002I	2007I	2003I
0-5.25 V	B100V	B108V	B101V	B106V	B109V	B102V	B107V	B103V	B104V	B105V	B100I	B108I	B101I	B106I	B109I	B102I	B107I	B103I
0-6.5 V	3000V	3008V	3001V	3006V	3009V	3002V	3007V	3003V	3004V	3005V	3000I	3008I	3001I	3006I	3009I	3002I	3007I	3003I
0-8 V	9000V	9008V	9001V	9006V	9009V	9002V	9007V	9003V	9004V	9005V	9000I	9008I	9001I	9006I	9009I	9002I	9007I	9003I
2-10 V	9090V	9098V	9091V	9096V	9099V	9092V	9097V	9093V	9094V	9095V	9090I	9098I	9091I	9096I	9099I	9092I	9097I	9093I
0-10 V	2400V	2408V	2401V	2406V	2409V	2402V	2407V	2403V	2404V	2405V	2400I	2408I	2401I	2406I	2409I	2402I	2407I	2403I
0-10.4 V	B500V	B508V	B501V	B506V	B509V	B502V	B507V	B503V	B504V	B505V	B500I	B508I	B501I	B506I	B509I	B502I	B507I	B503I
0-13 V	3400V	3408V	3401V	3406V	3409V	3402V	3407V	3403V	3404V	3405V	3400I	3408I	3401I	3406I	3409I	3402I	3407I	3403I
0-16 V	9400V	9408V	9401V	9406V	9409V	9402V	9407V	9403V	9404V	9405V	9400I	9408I	9401I	9406I	9409I	9402I	9407I	9403I
0-20 V	1C00V	1C08V	1C01V	1C06V	1C09V	1C02V	1C07V	1C03V	1C04V	1C05V	1C00I	1C08I	1C01I	1C06I	1C09I	1C02I	1C07I	1C03I
0-25 V	2800V	2808V	2801V	2806V	2809V	2802V	2807V	2803V	2804V	2805V	2800I	2808I	2801I	2806I	2809I	2802I	2807I	2803I
0-26 V	B000V	B008V	B001V	B006V	B009V	B002V	B007V	B003V	B004V	B005V	B000I	B008I	B001I	B006I	B009I	B002I	B007I	B003I
0-32.5 V	3800V	3808V	3801V	3806V	3809V	3802V	3807V	3803V	3804V	3805V	3800I	3808I	3801I	3806I	3809I	3802I	3807I	3803I
0-40 V	A400V	A408V	A401V	A406V	A409V	A402V	A407V	A403V	A404V	A405V	A400I	A408I	A401I	A406I	A409I	A402I	A407I	A403I
0-50 V	2C00V	2C08V	2C01V	2C06V	2C09V	2C02V	2C07V	2C03V	2C04V	2C05V	2C00I	2C08I	2C01I	2C06I	2C09I	2C02I	2C07I	2C03I
0-52 V	B400V	B408V	B401V	B406V	B409V	B402V	B407V	B403V	B404V	B405V	B400I	B408I	B401I	B406I	B409I	B402I	B407I	B403I
0-65 V	3C00V	3C08V	3C01V	3C06V	3C09V	3C02V	3C07V	3C03V	3C04V	3C05V	3C00I	3C08I	3C01I	3C06I	3C09I	3C02I	3C07I	3C03I
0-100 V	A800V	A808V	A801V	A806V	A809V	A802V	A807V	A803V	A804V	A805V	A800I	A808I	A801I	A806I	A809I	A802I	A807I	A803I
0-130 V	B800V	B808V	B801V	B806V	B809V	B802V	B807V	B803V	B804V	B805V	B800I	B808I	B801I	B806I	B809I	B802I	B807I	B803I

See next page for Bipolar Voltage and Current (mA) Input Switch Settings

