Data Sheet

4DIX/24VAC

Four Digital Input Expander Module

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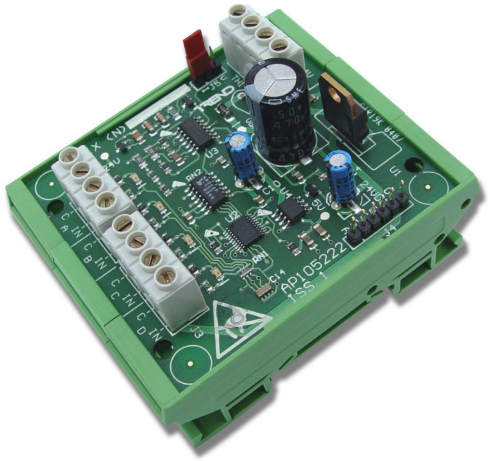


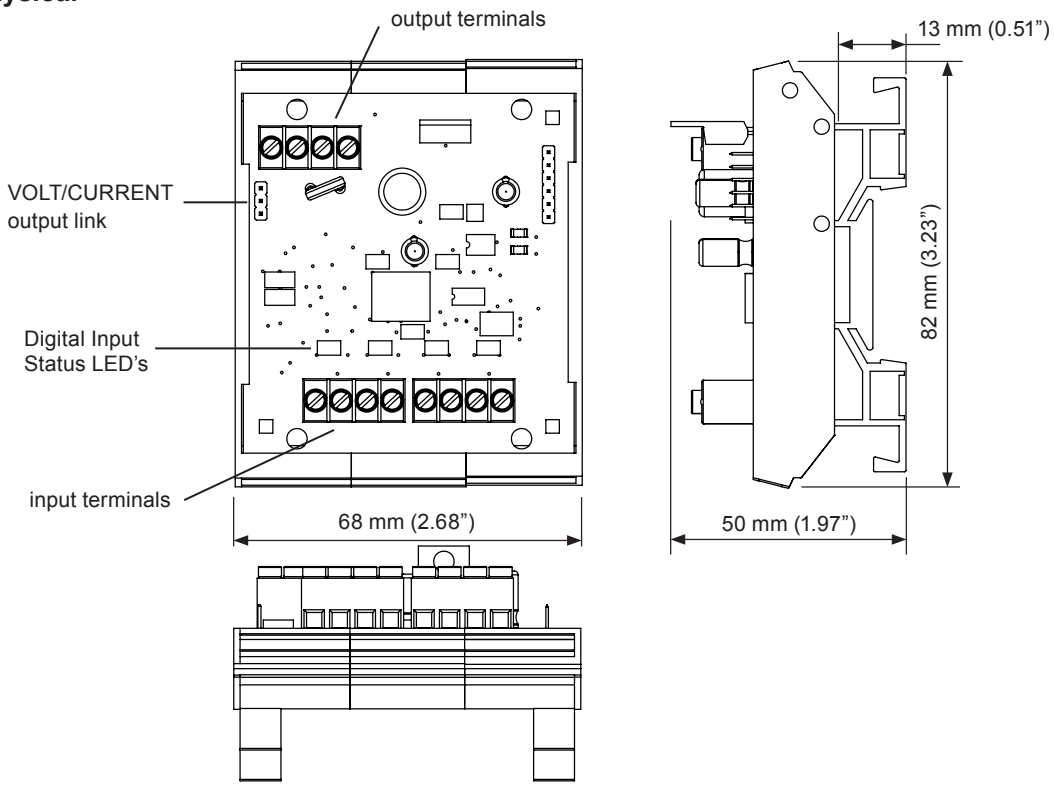
Description

The Digital Input Expander allows 4 volt free inputs to be monitored by a single analogue input channel. The resultant analogue value can be decoded by the A to D Function Module in an IQ controller to produce internal digital status bits for alarm monitoring or other status input applications. Wiring is facilitated by rising cage clamp type terminals, and a supply loop terminal aids wiring to additional modules.

Features

- 4 to 1 expansion on heavily used controller.
- Voltage or current output signal to IQ, link selectable.
- Monitoring of digital inputs that do not require rapid response.
- Standard DIN rail mounting.
- Rising cage clamp terminals.
- Input status monitoring by LED
- 24 Vac/dc.

Physical

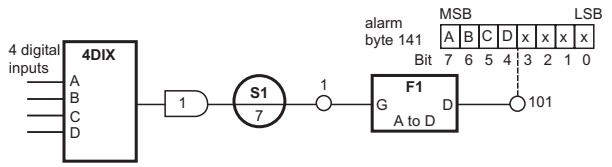


FUNCTIONALITY

Operation: The 4DIX converts 4 digital input (volt free contacts) into one analogue signal. This can be used to increase the input capability of an IQ controller. The resulting analogue channel can be split back into 4 digital signals within the controller (see strategy below).

Output Signal: A two position link header can be used to select either a voltage (0 to 10 V) or current (0 to 20 mA) output signal. The IQ input channel must be set appropriately.

Strategy: A strategy similar to that shown below should be set up in the controller. The strategy below is described more fully in the appropriate IQ Configuration Reference Manual.



The sensor scaling should be set as shown in specification section.

The SET 4DIX strategy blocks apply to IQ1, IQ2, IQ3/4, and IQeco and set up both sensor scaling and strategy modules. SET Strategy Library Path = Standard Block/Trend Products/ Input Output Modules/4Dix 4 Digit Expander Module/P01 - 4Dix Expander Module.

Faster operation of the inputs on post IQ2 controllers (IQeco, IQ3, IQ4) requires a more complex strategy. The input value requires to be steady for 1 second before being decoded. This removes unwanted signals being processed when the 4DIX transitions between states.

For the IQ3/4 the 4DIX is connected to sensor 1 whose output is eventually passed to the A to D function module, F4.

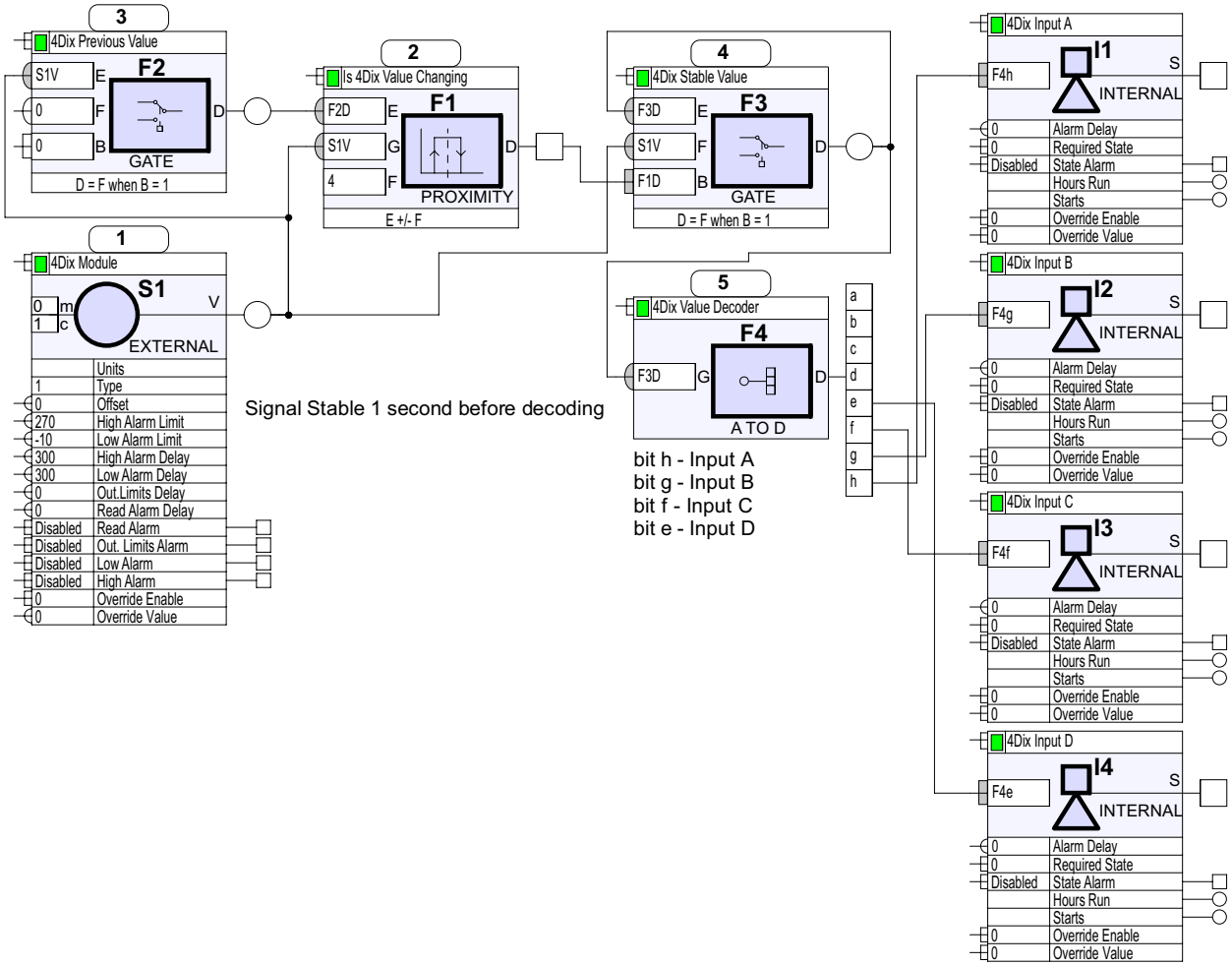
The relationship between the input bits and the function module output bits is shown in the table below:

DIX input	Dig output	Bit
A	h	7
B	g	6
C	f	5
D	e	4

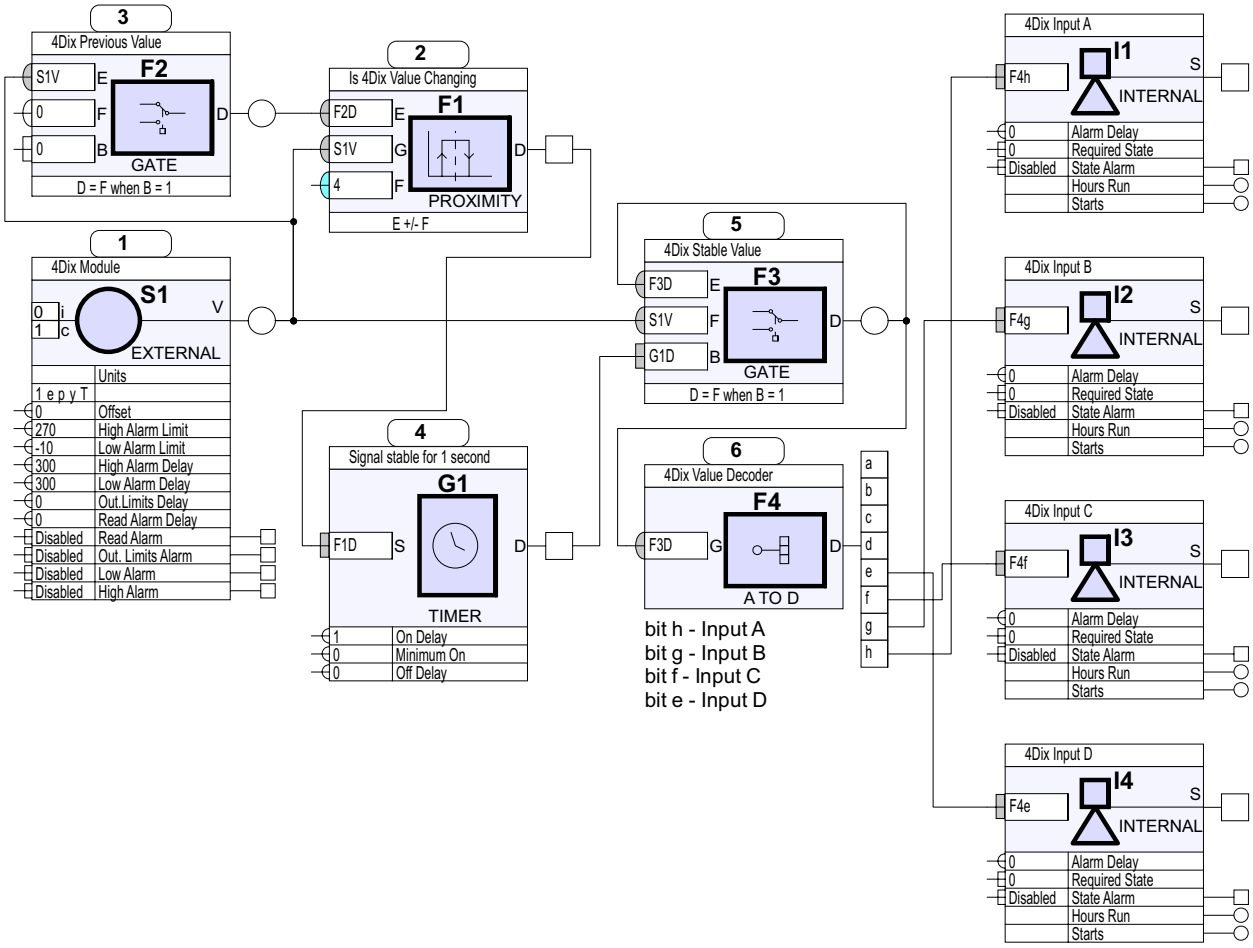
Due to the response of the IQ3 sensor module it is possible for the A to D to sample the sensor output value while the 4DIX is in transition between states, resulting in incorrect outputs. In order to avoid this, the strategy has extra modules to eliminate the transient values.

The strategy in the diagram compares the sensor's current value with its previous value and if the value is not changing it is passed to the A to D function module where it is decoded to set internal inputs 1 to 4 to the same status as the physical input to the 4DIX's. This filters unwanted changes due to the response of the input.

SET 4DIX strategy block



For IQeco the strategy is similar to the IQ3 but timer G1 adds the required delay to ensure a stable value.



Mounting: The 4DIX is designed to be mounted on a standard DIN rail.

Power connection: The 4DIX's power connection is made to a 24 Vdc (e.g. IQ's auxiliary supply) or 24 Vac isolated supply using the 0V and 24 V connectors.

Connectors: 1 part screw terminals for 0.5 to 2.5mm^2 cross section area (20 to 14 AWG) cable are used for inputs, outputs, and power connection. All terminals are rising cage clamp type.

INSTALLATION

The 4DIX should be installed inside a protective case close to the IQ controller. The unit is UL rated as 'UL916 listed accessory to open energy management equipment'. The procedure involves:

mount 4DIX in panel
set 4DIX output signal (V or I) if required
switch off power to controller
set IQ analogue input channel to match 4DIX output signal
wire 4DIX to controller
ensure HVAC equipment supply is switched off
wire HVAC equipment input to 4DIX
close panel
configure IQ (see strategy above)
switch on IQ
switch on 24 V supply to 4DIX
switch on HVAC equipment supply
check 4DIX operation

The installation procedure is covered by 4DIX/24VAC Installation Instructions (TG200651).

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF Four Digital Input Expander Module. The only part affected is the lithium battery (on the battery option board) which must be disposed of in a controlled way.

RECYCLING.
All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

WEEE Directive:

At the end of their useful life the packaging, and product , and battery (if fitted) should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.
Do not burn.

ORDER CODES

4DIX/24VAC	4 digital input expander module for DIN rail mounting.
4DIX/24VAC/USA/UL	4 digital input expander module for DIN rail mounting (for USA)

SPECIFICATION

ELECTRICAL

Input Power Supply voltage	:24 Vdc or Vac ±20%
Input Power Supply current	
24 Vac supply	:90 mA (I mode), 48 mA max (V mode)
24 Vdc supply	:40 mA (I mode), 20 mA max (V mode)
Input channels	4 off, volt free contact switching 24 Vdc. (Not suitable for counting inputs)
Input threshold	:upper, 12 V max (ON) level; lower, 4.5 V min (OFF) level
Distance	:maximum distance of 4DIX from controller 25 m (27 yards) (V mode) 1000 m (1090 yards) (I mode)
Output	:mode selectable by link header current/voltage (I/V)
I	:0 to 20 mA, maximum resistance of load 250 Ω
V	:0 to 10 Vdc, maximum curren 1 mA
LED	:Single LED per input channel, LED ON indicates contact closed.

IQ Configuration

It is recommended to use SET (software tool) for configuring the controller. SET is supplied with 4DIX strategy blocks for IQ1/2, IQ3/4, and IQeco controllers; the strategy is described above.

If the SET strategy block is used it will set up both sensor scaling and strategy modules.

The input channel must be linked to match the 4DIX output signal mode (I/V).

(a) Sensor scaling:

For all IQ2, IQ3/4 and IQeco series controllers with firmware version 2.1 or greater, the appropriate SET Unique Sensor Reference from the following should be used:

Voltage (V) mode: 4DIXV

Current (I) mode: 4DIXI

If not using SET, use sensor type scaling mode 5, characterise, with the appropriate scaling from the table below to match the 4DIX output signal mode for all IQ2 series controllers of firmware version 2.1 or greater or IQ3/4 and IQeco controllers; for all other IQ controllers see Sensor Scaling Reference Card (TB100521A).

Mode	Y	E	U	L	P	I_1	I_2	O_1	O_2
I	2	3	270	-1	2	0	20	0	268.25
V	0	3	27	-1	2	0	10	0	268.25

(b) Strategy:

The strategy must be set up to decode the digital status from the analogue input. IQ3/4 and IQeco are more responsive than IQ1/2 controllers and require more complex strategy. The SET 4DIX strategy blocks can be used as examples.

MECHANICAL

Dimensions	:82 mm (3.23”) x 68 mm (2.68”) x 50 mm (1.97”).
Connectors	:Single part with rising cage clamp terminals for 0.5 to 2.5 mm^2 cross section area (20 to 14 AWG) cable. Use copper cable only.
DIN rail	:Top hat profile (DIN46277-3, EN50022, BS5584:1978)

ENVIRONMENTAL

Safety	:EN61010
UL	:The unit is UL rated as ‘UL916 listed accessory to open energy management equipment’
Ambient Limits	
storage	:-10 °C (14 °F) to +70 °C (158 °F)
operating	:-10 °C (14 °F) to +50 °C (122 °F)
humidity	: 0 to 90 %RH non-condensing

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