

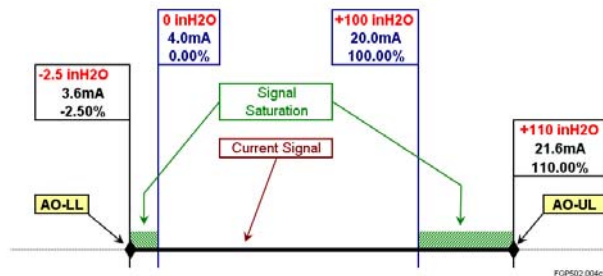
Yokogawa EJA and EJX series Brain and HART Protocol transmitters have an Analog Output Signal (4 to 20 mA) corresponding to the Primary Variable. The Analog Output Signal is generated from the digital signal supplied by the DP^{harp} sensor by a 15 Bit D/A signal converter. This conversion has a resolution of 0.004%. The transmitters are designed to drive output signals slightly greater than the 4 to 20mA "Base" signal. The intention is to set analog alarm thresholds recognizably beyond the normal operating 4 to 20 mA range, to indicate measurement out of range, and to set further alarm thresholds to indicate a fault condition.

Measurement Out-of-Range Standard Analog Output Signal

Yokogawa EJA and EJX transmitters

Standard Analog Output EJA (with option /F1) and EJX transmitters are factory set to have an Analog Output – Lower Limit (AO-LL) and Analog Output – Upper Limit (AO-UL) of 3.6mA and 21.6mA respectively [EJA transmitters without Option /F1 output limits are 3.2mA to 21.6mA]. This allows for a small amount of linear over-range process readings. This linear over-range signal is refer to **Signal Saturation**. During operation, once the AO-LL or AO-UL limits are reached, the current signal locks to the respective limit and the transmitter communicates a Measurement Out-Of-Range event to the control unit via the locked analog signal and digital communication (Brain or HART); and the indicator (if equipped) displays an error code. Once the normal pressure is regained, the transmitter clears the error codes, unlocks the analog signal and begins to operate as normal.

Example: An EJA110A or EJX110A transmitter is ranged for 0 to 100 inH₂O (4 to 20mA).



Example 3: EJX Standard Signal

The **Signal Saturation** can be controlled by setting the respective AO-LL and AO-UL. The AO-LL and AO-UL are programmable within the parameter limits of the transmitter via the digital communication protocol. Set the limits by entering the value to the parameter noted below.

Protocol	Parameter		Item	Content	Default Value
	No.	Name			
BRAIN	D15	OUT LIMIT (L)	Lower limit of analog output	-5.0 to +110.0%	-5.0%
	D16	OUT LIMIT (H)	Upper limit of analog output	-5.0 to +110.0%	+110.0%
BRAIN /F1	D15	OUT LIMIT (L)	Lower limit of analog output	-2.5 to +110.0%	-2.5%
	D16	OUT LIMIT (H)	Upper limit of analog output	-2.5 to +110.0%	+110.0%

Protocol	Label	Item	Content	Default Value
HART	AO Lower limit	Lower limit of analog output	-5.0 to +110.0%	-5.0%
	AO Upper limit	Upper limit of analog output	-5.0 to +110.0%	+110.0%
HART /F1	AO Lower limit	Lower limit of analog output	-2.5 to +110.0%	-2.5%
	AO Upper limit	Upper limit of analog output	-2.5 to +110.0%	+110.0%

Table 1: EJA Analog Output Digital Communication Protocol Parameters

Protocol	Parameter		Item	Content	Default Value
	No.	Name			
BRAIN	D20	AO Lower limit	Lower limit of analog output	3.60 to 21.60 mA	3.60 mA
	D21	AO Upper limit	Upper limit of analog output	3.60 to 21.60 mA	21.60 mA

Protocol	Label	Item	Content	Default Value
HART	AO Lower limit	Lower limit of analog output	3.60 to 21.60 mA	3.60 mA
	AO Upper limit	Upper limit of analog output	3.60 to 21.60 mA	21.60 mA

Table 2: EJX Analog Output Digital Communication Protocol Parameters

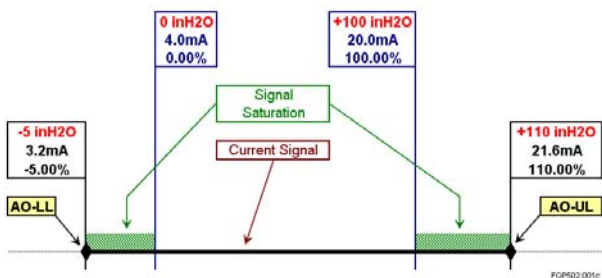
Ensure that the control unit receiving the analog signal is setup to recognize the settings used.

Namur NE43 Analog Output Signal

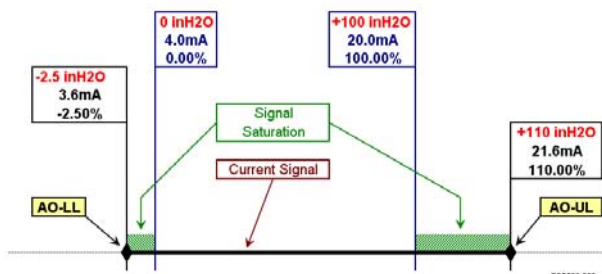
Yokogawa EJA and EJX transmitters

NAMUR NE43 is a standard used to define the operating AO-LL and AO-UL values of the analog output signal. Similar to the Standard analog output signal, Namur NE43 transmitters are designed to output signals greater than the 4 to 20mA "Base" signal; allowing for a small amount of linear over-range process readings (Signal Saturation). Namur NE43 transmitters set the AO-LL and AO-UL to 3.8mA (-1.25%) and 20.5mA (103.1%) respectively. Namur NE43 thresholds are set and can not be programmed to different values through the Digital protocol.

Ensure that the control unit receiving the analog signal is setup to recognize the Namur NE43 settings used.

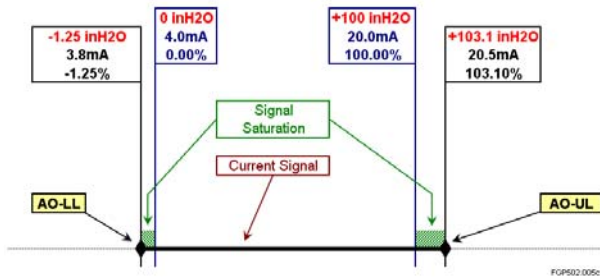


Example 1: EJA Standard Analog Output Signal (without /F1 option)



Example 2: EJA Standard Analog Output Signal (with /F1 option)

Example: If an EJA110A or EJA110A with Namur NE43 analog output signal is ranged for 0 to 100 inH₂O (4 to 20mA). The transmitter is capable of measuring and transmitting an output signal of -1.25 to 103.1 inH₂O (3.8 to 20.5mA).



Example 4: EJA and EJX NAMUR NE43 Signal

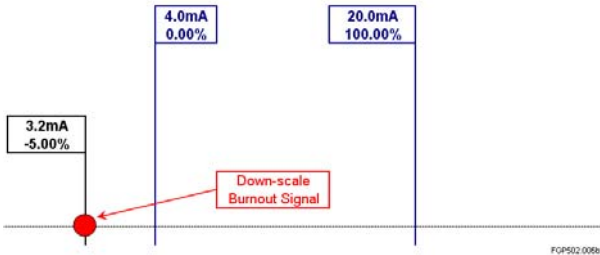
Fault Condition

Standard and Namur NE43 Analog Output

Both the Standard and Namur NE43 analog output signals have defined a Hardware Failure as a Fault Condition. Preset values have been assigned upon hardware failure. Once the transmitter diagnostics have detected a Hardware failure, the analog signal immediately changes to this value. The customer can choose between two different presets.

Down-Scale Burnout

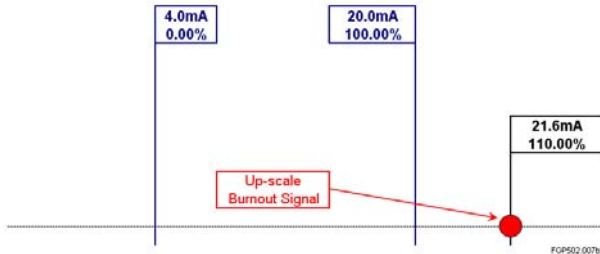
Down-scale Burnout refers to the transmitter outputting a -5% (3.2mA) signal ("Down-Scale") at hardware failure (Burnout).



Graph 1: Down-Scale Burnout

Up-Scale Burnout

Up-scale Burnout refers to the transmitter outputting a 110% (21.6mA) signal ("Up-Scale") at hardware failure (Burnout).



Graph 2: Up-Scale Burnout

The Up-Scale and Down-Scale Burnout can be set in the field via a jumper or switch located on the CPU assembly board in each transmitter. Refer to the *Instruction Manual* for the specific transmitter for information on accessing the CPU assembly board. Once the CPU assembly board is located, the jumper or switch can be set as follows:

EJA						
BRAIN						
	<table border="1"> <thead> <tr> <th>Burnout Direction</th> <th>Setting Pin Position (CN4)</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>H <input type="checkbox"/> L <input type="checkbox"/></td> </tr> <tr> <td>Low</td> <td>H <input type="checkbox"/> L <input type="checkbox"/></td> </tr> </tbody> </table>	Burnout Direction	Setting Pin Position (CN4)	High	H <input type="checkbox"/> L <input type="checkbox"/>	Low
Burnout Direction	Setting Pin Position (CN4)					
High	H <input type="checkbox"/> L <input type="checkbox"/>					
Low	H <input type="checkbox"/> L <input type="checkbox"/>					
HART	<p>For HART with /F1 Option</p>					
	<table border="1"> <thead> <tr> <th>Burnout Direction</th> <th>Write Protect Switch</th> </tr> </thead> <tbody> <tr> <td>L <input type="checkbox"/> H <input type="checkbox"/></td> <td>Y <input type="checkbox"/> N <input type="checkbox"/></td> </tr> </tbody> </table>	Burnout Direction	Write Protect Switch	L <input type="checkbox"/> H <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	
Burnout Direction	Write Protect Switch					
L <input type="checkbox"/> H <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>					
EJX						
Brain or HART						
	<table border="1"> <thead> <tr> <th>Burnout Direction</th> <th>Write Protect Switch</th> </tr> </thead> <tbody> <tr> <td>BO H <input type="checkbox"/> L <input type="checkbox"/></td> <td>WR E <input type="checkbox"/> D <input type="checkbox"/></td> </tr> </tbody> </table>	Burnout Direction	Write Protect Switch	BO H <input type="checkbox"/> L <input type="checkbox"/>	WR E <input type="checkbox"/> D <input type="checkbox"/>	
Burnout Direction	Write Protect Switch					
BO H <input type="checkbox"/> L <input type="checkbox"/>	WR E <input type="checkbox"/> D <input type="checkbox"/>					

Table 3: EJA / EJX Hardware Burn-out Switch

Ensure that the control unit receiving the analog signal is setup to recognize these settings as a fault condition.

Factory Settings

Standard and Namur NE43 Analog Output

The factory can set these parameters during assembly using the following option codes.

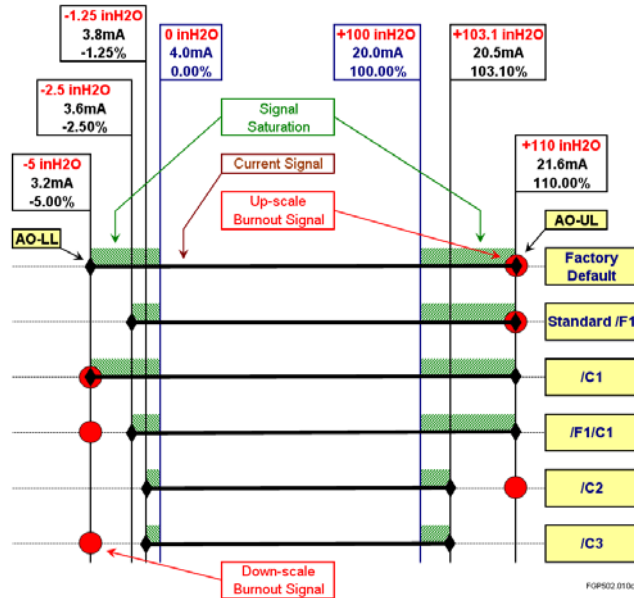
	Analog Output Signal			
	Standard		Namur NE43	
	Down-Scale Burnout	Up-Scale Burnout	Down-Scale Burnout	Up-Scale Burnout
EJA	IC1	Factory Default	IC2	IC3
EJX	IC1	Factory Default	IC2	IC3

Table 3: EJA / EJX Model Code Option Codes

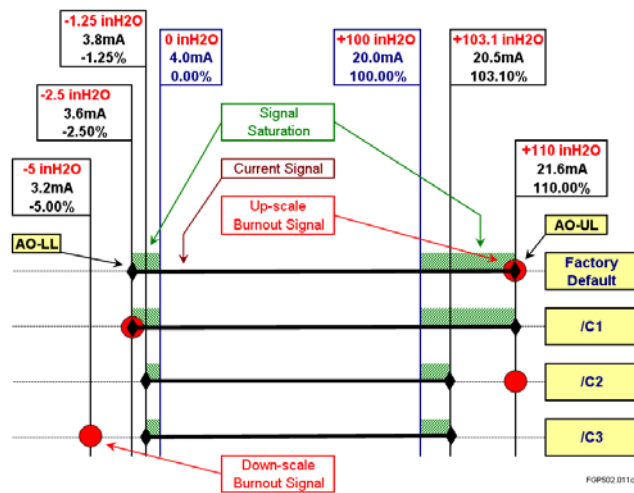
Comparison

Standard and Namur NE43 Analog Output

Example 5: A transmitter ranged 0 to 100 inH₂O (4 to 20mA).



Example 5A: EJA Analog Output Option Comparison



Example 5X: EJX Analog Output Option Comparison

Overview

Analog Output Signal

EJA Series

- Standard Analog Output Signal available with programmable **Signal Saturation** limits.
- Namur NE43 Analog Output Signal available.
- Hardware Failure (Burnout) is selectable in the field.

EJX Series

- Standard Analog Output Signal available with programmable **Signal Saturation** limits.
- Namur NE43 Analog Output Signal available.
- Hardware Failure (Burnout) is selectable in the field.

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