LABOR – ASTER

INDUSTRIAL AUTOMATION

AC 083
QMS

BLOCK OF MATHEMATICAL AND LOGICAL FUNCTIONS
Type BF-S2

- **Large library of arithmetic functions to choose from, as well as any function upon request.**
- **Up to 4 analog inputs, differentia.**
- **1 analog output in any standard.**
- **1 binary input for OC type signal.**
- **1 binary output type OC.**

APPLICATION

Function block **BF-S2** is designed to convert a maximum of 4 input analog signals and 1 binary signal into 1 output analog signal and/or 1 output binary signals. The type of converting function is programmed by the manufacturer according to the user's order code. Typical processing functions are:

- sum and difference of signals,
- quotient and product of signals,
- square root of the combination of signals,
- maximum or minimum selector of signals,
- dynamic (LED/LAG) and integrating elements.

The **BF-S2** function block is designed to be mounted on a TS35 rail in a control cabinet, desktop or box directly on the facility.

BASIC TECHNICAL PARAMETERS

1.	Device dimensions	-	22.5 x 99 x 114.5 mm
2.	Power supply	-	nominal 24 V_{DC} / 60 mA
			allowable 21 ÷ 28 V_{DC}
3.	Output signal **„Y"**	-	0/4 ÷ 20 mA / 850 Ω
			0/1 ÷ 5 mA / 3 kΩ
			0 ÷ 10 V / 5 kΩ
			other
	a. accuracy class	-	0.1%
	b. resolution	-	< 0.025%
	c. separation		optoelectrical
4.	Analog inputs	-	0/4 ÷ 20 mA / 100 Ω
	„**X1, X2, X3, X4**"		0÷10 V / >250 kΩ
			0/1 ÷ 5 mA / 400 Ω
			other
	a. accuracy class	-	0.1%
	b. resolution	-	< 0.025%
	c. differential		without common pole
	d. separation		high-resistance
	e. max common signal	-	±60V
5.	Binary input **„DI"**	-	
	a. low level	-	„0" < 500Ω
	b. high level	-	„1" >10kΩ
	c. internal supply	-	12V / 6mA
	d. separation		optoelectrical
6.	Binary output „**DO"**		**OC** 4.5÷36VDC / 100mA
		-	
	a. max voltage drop on OC	-	< 2.4V
	b. separation		optoelectrical
7.	All circuit mutually separated from each other 2kV		
8.	Service cycle		250 ms
9.	Standard digital filter		500 ms
10.	Cable connectors		0.5 ...1.5mm^2
		-	8 pairs of terminals
11.	Working conditions		
	- Ambient temperature - storing: -30°C...+60°C		
	- Ambient temperature - working: -25°C...+60°C		
	- Relative humidity: max 90%, no water vapor condensation		
	- Ambient atmosphere: free from dust and aggressive fumes		
12.	Safety requirements	-	PN-EN 61010-1:2002
13.	EMC requirements	-	PN-EN 61000-6-1
		-	PN-EN 61000-6-3

STANDARD ALGORITHM LIBRARY:

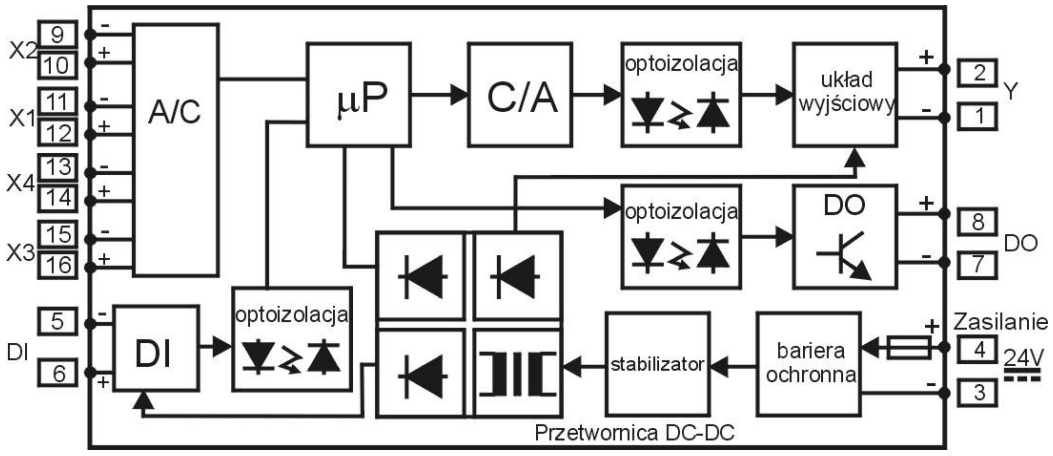
	FUNCTION	ALGORITHM MODEL
1.	sum / difference 1	**Y = X1 + X2 + X3 - X4**
2.	sum / difference 2	**Y = X1 + X2 - X3 - X4**
3.	averaged sum / difference with weight 1	**Y = (K1·X1 + X2 - X3)/K2**
4.	averaged sum / difference with weight 2	**Y = (K1·X1+X2+X3-X4)/K2**
5.	square root 1	**Y = √X1**
6.	square root 2	**Y = √(X1+X2)**
7.	square root 3	**Y = X1 / √X2**
8.	quadratic function	**Y = K1·X1·X1**
9.	product / quotient	**Y = K1·X1·X2 / X3**
10.	maximum selector	**Y = max(X1, X2, X3, X4)**
11.	minimum selector	**Y = min(X1, X2, X3, X4)**
12.	advance / delay LEAD / LAG	**Y= [(T1·s+1)/(T2·s+1)]·X1**
13.	differential	**Y= [T1·s/(T2·s+1)]·X1**
14.	integrator	**Y= (T1/s)·X1**
15.	user function	**DEFINED BY USER**

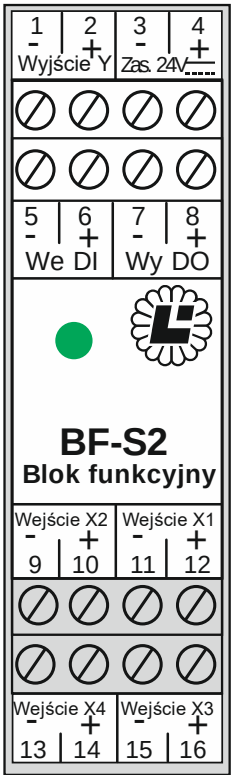
Input DI and output DO function defined on request.

Note:
The specific properties of the square root function are:
- it operates on signal 0...1
- for value ≤ 0 result = 0
- for value ≥ 1 result = 1

FUNCTIONAL DESCRIPTION

Input signals from the A/C converter are digitally filtered and then normalized to a signal in the range **0...1.** Then the input signals are converter according to the selected algorithm. The results from the algorithm processing are transformed into an output signal and sent to the C/A converter and/or binary output.
Correct operation of the function block is indicated by pulsing of LED diode in time with the cycle of measurement inputs service.





HOW TO ORDER:

Function block type BF-S2 – X - X - XX

type of analog inputs **0..5**

type of analog outputs **0...5**

function **1....15**

CODE OF INPUT AND OUTPUT SIGNAL RANGE:

0. - 4 .... 20 mA
1. - 0 .... 20 mA
2. - 0 .... 10 V
3. - 1 .... 5 mA
4. - 0 .... 5 mA
5. - other (define current or voltage range)

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