Sistemas Supervisório Moderno – SISA
Curso Superior de Tecnologia em Automação Industrial - 6º Módulo – 1º Semestre de 2016
Aula sobre CLP Stardom YOKOGAWA

Professor:

Marcelo Saraiva Coelho

STARDOM YOKOGAWA

- **Autônomo, Processador Pentium MMX 166MHz**
- **Memória RAM 128MB, Compact Flash 256MB**
- **Scan dos analógicos 20ms, digital 10ms**
- Temperatura de Operação 0-55/60 C
- Umidade de Operação 5-95% RH
- Proteção contra gás corrosivo Classe G3
- Refrigeração por ar natural (sem ventiladores)
- Certificação FM (Non Incendive) para Classe 1Div 2
- Rede Dual Ethernet 100 Mbps

6 AI

2 AO

2 canais FF

16 DI

16 DO

2 seriais

2 Ethernet

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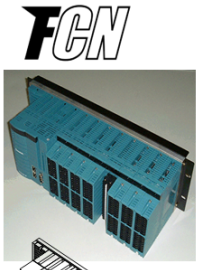
•Capacidade máxima por sistema

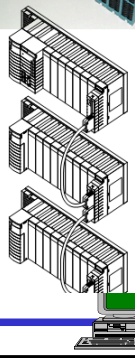
•DI 256
•DO 256
•AI 96
•AO 32

•8 cartões FF X 4 canais = 32 canais

•32 canais FF X 16 devices = 512 devices

•**Total Geral** **1152 pontos**





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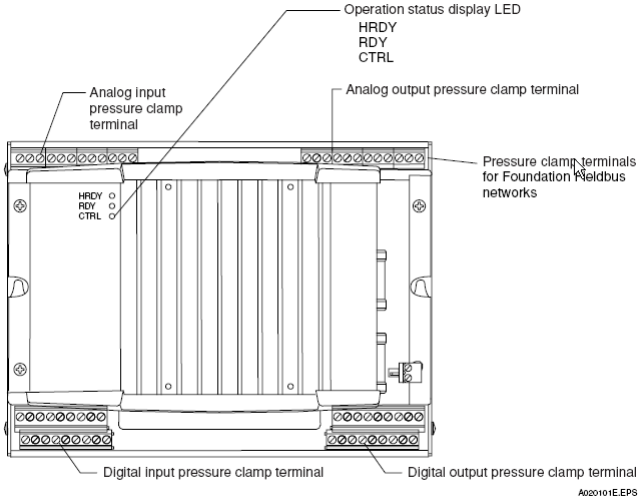

Figure FCJ (Front)

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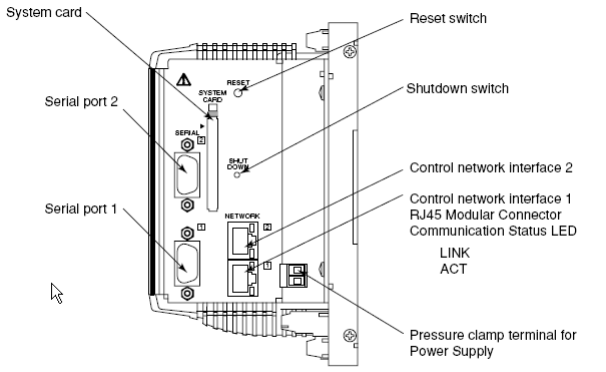

Figure FCJ (Side)

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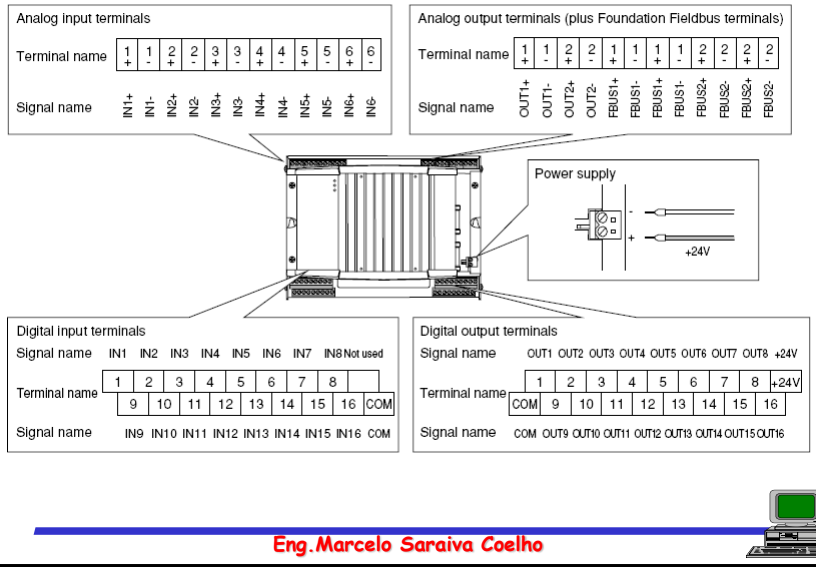

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- **Terminal Numbers and Example of External Connections for Digital Input**

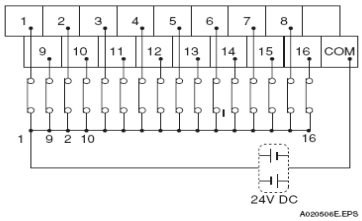
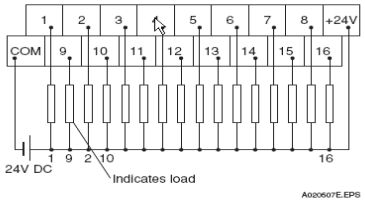


Figure FCJ Digital Input Terminal Numbers and External Connections

- **Terminal Numbers and Example of External Connections for Digital Output**



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ESPECIFICAÇÕES ENTRADAS ANALÓGICAS

Item		Specification
Input points		6
Input signals		1 to 5 V differential, non-isolated
Maximum absolute input voltage		±7.5 V
Input resistance	During power-on	1 MΩ or more
	During power-off	340 kΩ or more
Allowable signal source resistance		500 Ω or less
Accuracy		±0.3% of full scale when all DI/Os are off ±0.4% of full scale when all DI/Os are on
Maximum temperature drift		±0.01%/°C (Max)
A/D resolution		15 bits/1-5 V
Data refresh cycle		10 ms
Input step response time		100 ms
Normal mode noise rejection ratio		37 dB or more (with power supply frequency at 50/60 Hz)
External connections		M2.5 pressure-clamp terminals

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ESPECIFICAÇÕES SAÍDAS ANALÓGICAS

Item	Specification
Output points	2
Output signals	4 to 20 mA DC, non-isolated
Allowable load resistance	0 to 750 Ω
Accuracy	±0.5% of full scale when all DI/Os are off ±0.6% of full scale when all DI/Os are on
Temperature drift	±0.01%/°C
D/A resolution	11 bits/4-20 mA
Data refresh cycle	10 ms
Step response time	40 ms
Output fallback (*2)	• HOLD (holds the current level when the fallback action is triggered). • SETV (sets the output to the preset level when the fallback action is triggered).
Output ripple	50 mVp-p (with 250 Ω load)
Output open detection	Provided
External connections	M2.5 pressure-clamp terminals

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*1: The fallback detection time is 4 seconds.

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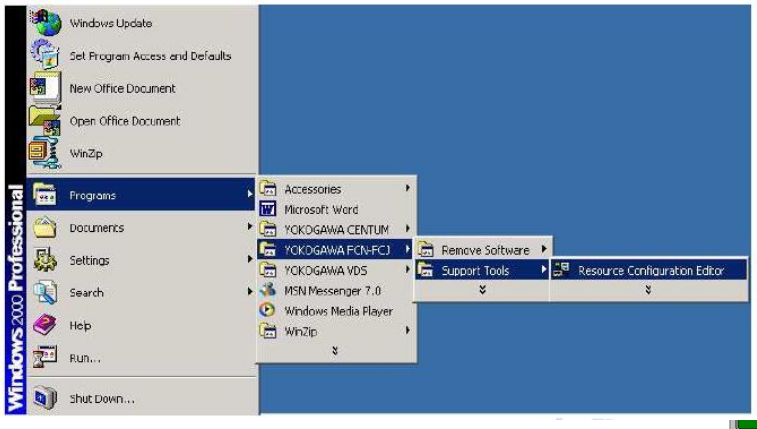
RESOURCE CONFIGURATOR



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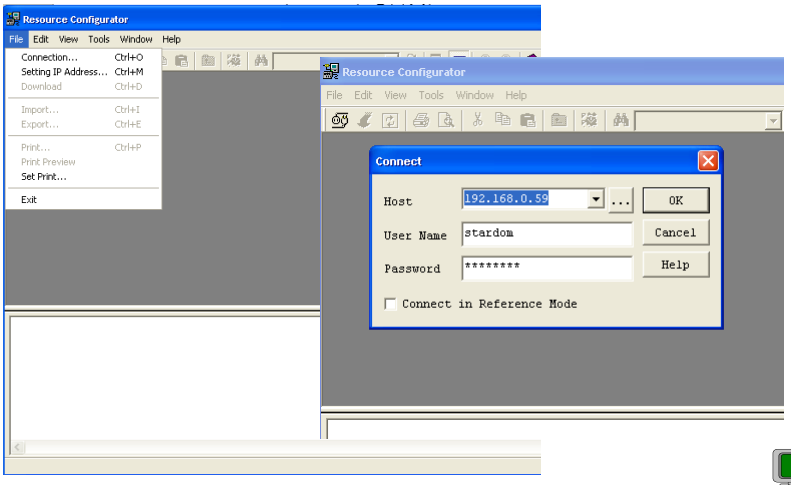
CONEXÃO COM O RESOURCE CONFIGURATOR



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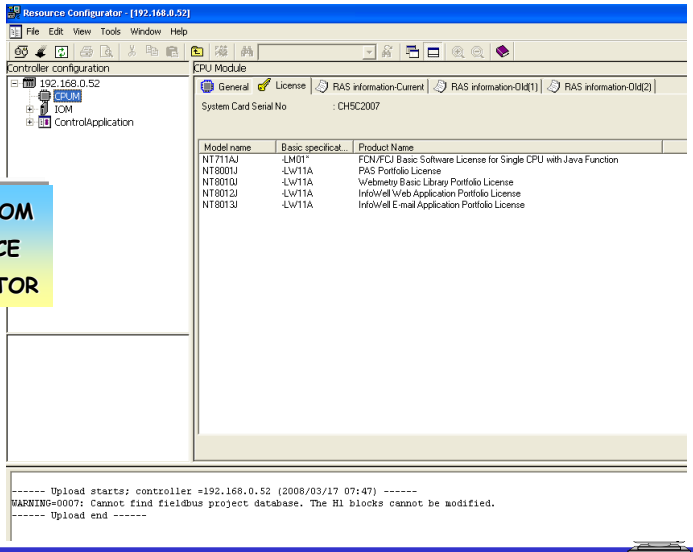

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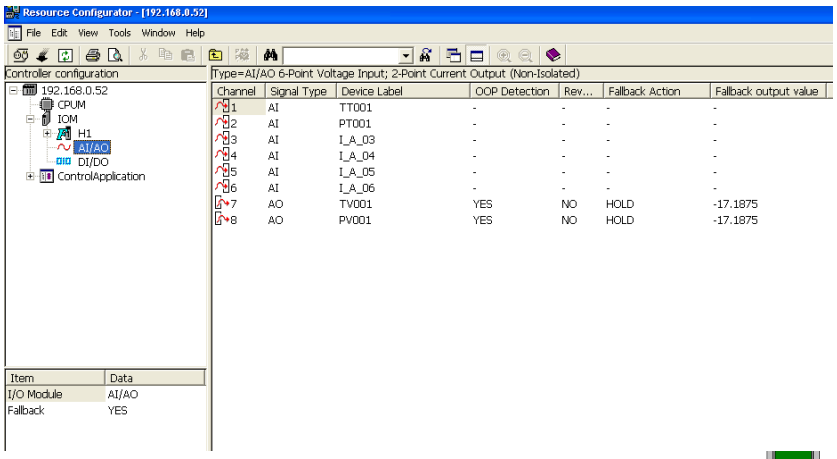

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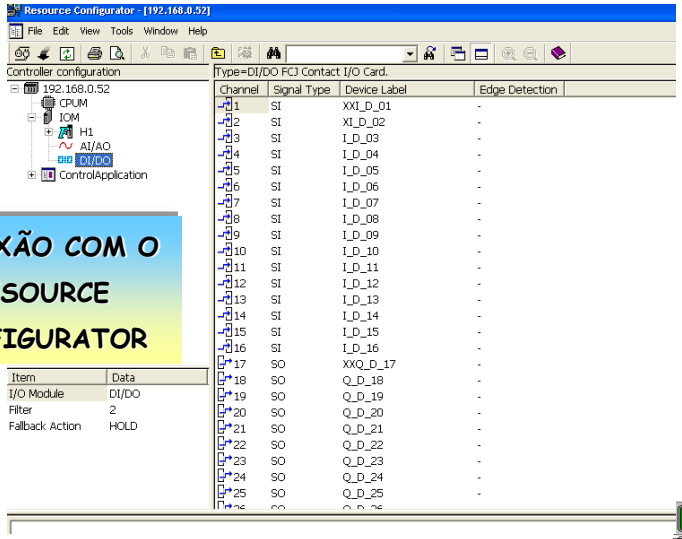

CONEXÃO COM O RESOURCE CONFIGURATOR

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TIPO DE DADOS: CData_REAL

- **CData_REAL type data**

CData_REAL type data are used in analog control and has the following structure.

CData_REAL type data structure

Value	Data value (REAL type, engineering volume data)
Status	Data status (DWORD type)
CInfo	Connection information (DWORD type, for internal use)
SH	Scale high limit (REAL type)
SL	Scale low limit (REAL type)
Unit	Engineering unit (IndUnit type)

* REAL type is 32-bit floaing point data
* DWORD type is 32-bit bit string data
* IndUnit type is 8-byte character string data

Figure CData_REAL Type Data Structure

CData_REAL type data stores numeric values as engineering volume data, that is, numerical values are represented in engineering units.

Information on inter-NPAS POU input/output connections used in analog control is typically passed as CData_REAL type data structures.

TIP

The individual data elements in a data structure (e.g. Value, Status, CInfo, SH, SL, Unit for the CData_REAL data structure described above) are known as members of the data structure.

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SISTEMA DE CONTROLE COM VDS

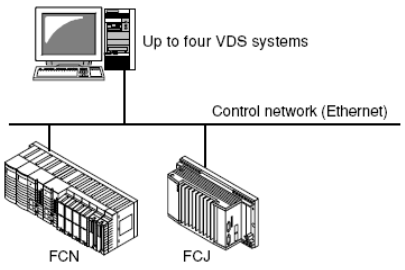

Figure A System where FCN/FCJ Autonomous Controllers Operate by Linking with a VDS System

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SISTEMA DE CONTROLE COM OPC-SERVER

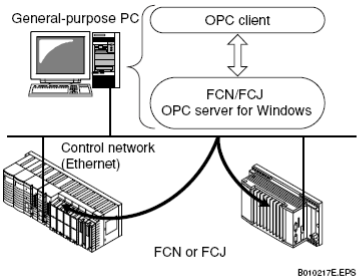

Figure Example of the System: FCN/FCJ Autonomous Controllers operate linking with OPC Servers for Windows

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TIPO DE DADOS: CData_INT e Cdata_BOOL

- **Other representative data structures**

In addition to CData_REAL type data, some other data structure types are also used to store information on inter-NPAS POU connections.

The names of these data structures and their members are given below.

CData_INT type data structure

Value	Data value (INT type)
Status	Data status (DWORD type) * INT type is 16-bit signed integer data
CInfo	Connection information (DWORD type, for internal use)

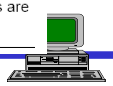
CData_BOOL type data structure

Value	Data value (BOOL type)
Status	Data status (DWORD type) * BOOL type is 1-bit on/off data
CInfo	Connection information (DWORD type, for internal use)

Figure CData_INT type, CData_BOOL type Data Structures

TIP

The data structures described above are representative data structures. Many other data structures are used within NPAS POUs, and they will be described separately for each NPAS POU.



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NPAS_MLD

■Interfaces of the POU

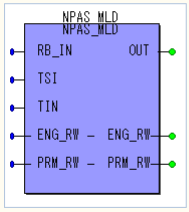

FIGURE: Interfaces of NPAS_MLD POU

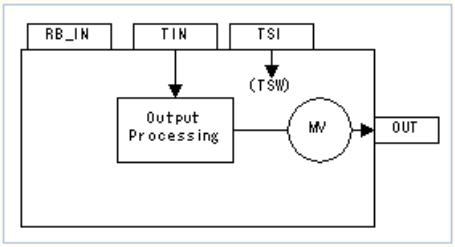

FIGURE: Block diagram of the Manual Loader POU

Conexão típica de NPAS_MLD

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NPAS_MLD

■Interfaces of the POU

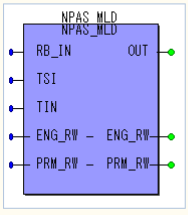

FIGURE: Interfaces of NPAS_MLD POU

Parâmetros de NPAS_MLD

Table: I/O Parameters of the Manual Loader POU

Parameter	Data type	Attribute	Description
RB_IN	CData_REAL	INPUT	Read back value input from the output destination
TSI	INT	INPUT	Tracking SW input (1: OFF, 2: ON, 0: invalid data)
TIN	CData_REAL	INPUT	Tracking signal input
OUT	CData_REAL	OUTPUT	Output value
ENG_RW	SD_NPENG_MLD	IN_OUT	Engineering parameter setting
PRM_RW	SD_NPPRM_MLD	IN_OUT	Access parameter reference and setting

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NPAS_MLD

■Interfaces of the POU

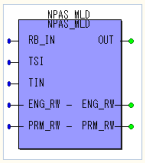

FIGURE: Interfaces of NPAS_MLD POU

Parâmetros de NPAS_MLD

Table: Access parameters (Data items listed below have RETAIN/OPC.)

Access parameter	Data type	Writable	Description	Range	Initial value
MODE	DWORD	✔(✔)	Block mode	-	MAN
ALRM	DWORD	-(-)	Alarm status	-	NR
AF	DWORD	-(✔)	Alarm detection specification	-	FFFFFFFF
AOFS	DWORD	-(✔)	Alarm masking specification	-	0
AOF	BOOL	✔(✔)	Alarm batch inhibition	0(AON) 1(AOF)	0(AON)
MV	CData_REAL	✔(✔)	Manipulated output value	MSL to MSH	MSL
MH	REAL	✔(✔)	Output high limit	MSL to MSH	MSH
ML	REAL	✔(✔)	Output low limit	MSL to MSH	MSL
TSW	BOOL	✔(✔)	Tracking switch	0 (No) 1 (Yes)	0 (No)
RSW	BOOL	✔(✔)	Pulse width reset switch	0 (No) 1 (Yes)	0 (No)
DMV	CData_REAL	-(-)	MV difference	±(MSH-MSL)	0.0

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NPAS_MLD

■Interfaces of the POU

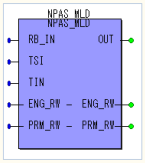

FIGURE: Interfaces of NPAS_MLD POU

Parâmetros de NPAS_MLD

Table: Engineering parameters (Data items listed below have RETAIN/OPC.)

Engineering parameter	Data type	Writable	Description	Range	Initial value
_MV_VEL_ACT_SW	BOOL	✔	MAN-time output velocity limiting bypass switch	0 (No) 1 (Yes)	0 (No)
_MV_VEL	REAL	✔	Velocity limit value	0.0 - 100.0%	100.0%
_MVTRK_ACT_SW	BOOL	✔	Output tracking SW	0 (No) 1 (Yes)	0 (No)
_MV_RANGE_HI	REAL	✔	MV range high limit value	Numerical value of max 7 digits, including sign and decimal point	100.0
_MV_RANGE_LO	REAL	✔	MV range low limit value		0.0
_MV_UNIT	STRING(8)	✔	MV engineering unit	-	'%'
TRV	CData_REAL	-	Tracking signal	MSL - MSH	-
COMMENT	STRING(32)	✔	Comment		

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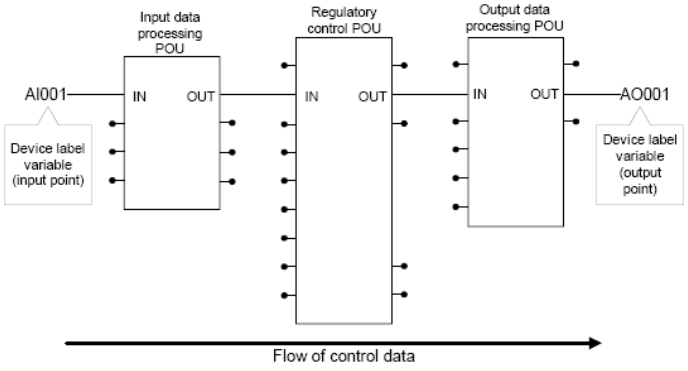
CONFIGURAÇÃO COM NPAS_POU



Conexão típica de NPAS_POU
para uma malha de controle

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CONFIGURAÇÃO COM NPAS_POU

Os NPAS_POU

Estão agrupados em categorias:

- Input Data Processing POU;
- Regulatory Control POU;
- Output Data Processing POU;
- Arithmetic Calculation POU;
- Sequence POU;
- FF-H1 (fieldbus) POU;
- Utility POU

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CONFIGURAÇÃO COM NPAS_POU

Lista de NPAS_POU's da categoria: Input/Output Data Processing POU

NPAS POU	Description
NPAS_AI_ANLG	Standard Analog Input POU
NPAS_AI_TEMP	Measured Temperature Input POU
NPAS_AI_PCNT	Exact Pulse Train Input POU
NPAS_AI_PULS_QT	Control Priority Type Pulse Train Input POU
NPAS_AI_PULS_CI	Regularized Data (%) Input POU
NPAS_DI_STS	Standard Analog Output POU
NPAS_DI_PUSHB	Status Input POU
NPAS_AO_ANLG	Pushbutton Input POU
NPAS_DO_STS	Status Output POU
NPAS_DO_STS_PW	Pulse Width Output POU
NPAS_DO_STS_PW	High Resolution Pulse Width Output POU
NPAS_DO_STS_TP	Time-proportional ON/OFF Output POU
NPAS_FFI_ANLG	FF-H1 Analog Input POU
NPAS_FFI_STS	FF-H1 Status Input POU
NPAS_FFO_ANLG	FF-H1 Analog Output POU
NPAS_FFO_STS	FF-H1 Status Output POU
NPAS_AI_HART	HART Variable Input POU

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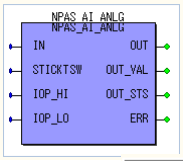
CONFIGURAÇÃO COM NPAS_POU

Parâmetros de Entrada/Saída do NPAS_AI_ANLG



Parameter	Data type	Attribute	Description
IN	DTag_I_Anlg	INPUT	Process input
STICKTSW	BOOL	INPUT	PV overshoot switch
IOP_HI	REAL	INPUT	High limit input open detection set value
IOP_LO	REAL	INPUT	Low limit input open detection set value
OUT	CData_REAL	OUTPUT	Signal-converted data output
OUT_VAL	REAL	OUTPUT	Value of the output data structure
OUT_STS	DWORD	OUTPUT	Data status of the output data structure
ERR	INT	OUTPUT	Error code for any internal error

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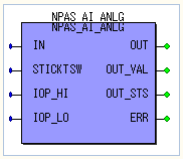
CONFIGURAÇÃO COM NPAS_POU

Parâmetros de Entrada/Saída do NPAS_AI_ANLG



Parameter	Range	Default
IN	-	-
STICKTSW	0: Hold 1: Overshoot	0
IOP_HI	-25. 0 to 125. 0%	106.3%
IOP_LO	-25. 0 to 125. 0%	-6.3%
OUT	(OUT.Value: SL to SH)	-
OUT_VAL	-	-
OUT_STS	-	-
ERR	0: Normal 1: Division by 0 2: Buffer overflow 3: Abnormal parameter 4: Other error	0

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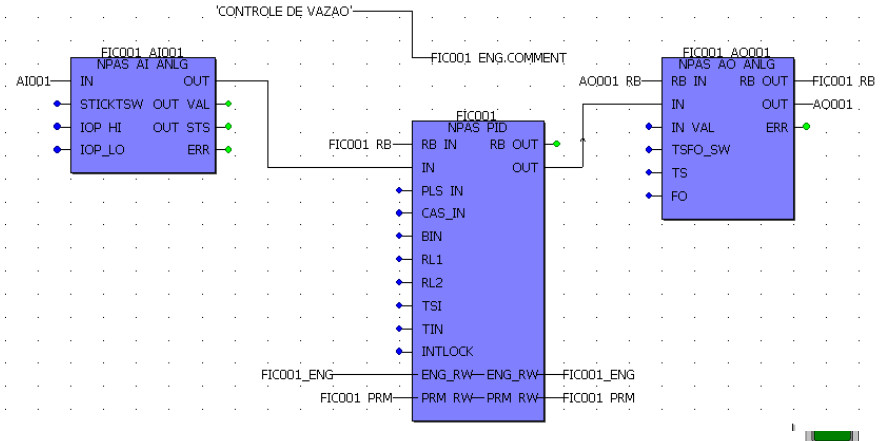
CONFIGURAÇÃO COM NPAS_POU

Exemplo de programação com NPAS_POU



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