MUZ - Driver of Protocol for MUZ Devices User's Manual

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1. MUZ - Driver of Protocol for MUZ Devices

1.1. Driver Use

The MUZ driver is used for data exchange between Microprocessor Protecting Devices (MUZ) of the MUZ-RO type made by JMTronik Warsaw and an **asix** system computer. For communication with the **asix** system an interface in the RS-232C standard is used.

1.2. Declaration of Transmission Channel

The full syntax of declaration of transmission channel which operates according to the MUZ protocol is given below:

name=MUZ,*id*,*type*,*port*,*int*,*fifo*,*txtAlarmOffset*,*valAlarmOffset*

where:

name	- name of the logical channel;
MUZ	- driver name;
Id	- number of MUZ in the network;
Type	- identifier of the MUZ type (MUZRO = 7);
Port	- address of the serial port (HEX);
Int	- interruption number;
Fifo	- FIFO buffer length (by default, 8);
txtAlarmOffset	- number added to the number of a text alarm transferred from the MUZ;
valAlarmOffset	- number added to the alarm number with the value transferred from the MUZ.

EXAMPLE

The declaration for the MUZ RO numbered 2 connected to COM2. To the text alarm numbers will be added a value of 10, to the alarm numbers will be added a value of 20:

CHANNEL = MUZ,2,7,2f8,3,8,10,20

NOTE
If the MUZ driver threads can not receive an access to AMEN, then you should increase the number of AMEN users. (See item: NUMBER_OF_USERS).

1.3. Kinds of Variables Used in Data Exchange with MUZ Devices

In the operation of data exchange with MUZ devices, the variables are divided into groups differing with data kind and addressing method. To each group a different symbolic address is assigned. The data are divided into the following groups:

- Values of analog measures,
- Binary inputs handled together with measurements,
- Rated values and settings of protections,
- Binary inputs related to protection settings, Variables used for control,
- Variables containing status of events with value,

- Specific variable in MUZRO.

The way of configuring the individual groups of variables is described below.

Table 1. Values of Analog Measures.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
P1	Current I0	Byte3->Float	Reading
P2	Current I1	Byte3->Float	Reading
P3	Current I2	Byte3->Float	Reading
P4	Current I3	Byte3->Float	Reading
P5	Voltage U0	Byte3->Float	Reading
P6	Voltage U1	Byte3->Float	Reading
P7	Voltage U2	Byte3->Float	Reading
P8	Voltage U3	Byte3->Float	Reading
P9	cos(f1)	Byte4->Float	Reading
P10	cos(f2)	Byte4->Float	Reading
P11	cos(f3)	Byte4->Float	Reading
P12	active power	Byte3->Float	Reading
P13	reactive power	Byte3->Float	Reading
P14	active energy	BCD6->Float	Reading
P15	reactive energy	BCD6->Float	Reading

Table 2. Binary Inputs Handled Together with Measurements (State of Single Bits is Transferred)

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
SP1	switch status, closed	Bit (0/1)->Word	Reading
SP2	switch status, closed	Bit (0/1)->Word	Reading
SP3	freely used by client	Bit (0/1)->Word	Reading
SP4	freely used by client	Bit (0/1)->Word	Reading
SP5	local opening of switch	Bit (0/1)->Word	Reading
SP6	freely used by client	Bit (0/1)->Word	Reading
SP7	freely used by client	Bit (0/1)->Word	Reading
SP8	local closing of switch	Bit (0/1)->Word	Reading
SP9	signal for technological protection	Bit (0/1)->Word	Reading
SP10	signal for technological protection 10	Bit (0/1)->Word	Reading
SP11	signal for technological protection 11	Bit (0/1)->Word	Reading
SP12	signal for technological protection 12	Bit (0/1)->Word	Reading
SP13	signal for technological protection 13	Bit (0/1)->Word	Reading
SP14	signal for technological protection 14	Bit (0/1)->Word	Reading
SP15	signal for technological protection 15	Bit (0/1)->Word	Reading
SP16	signal for technological protection 16	Bit (0/1)->Word	Reading
SP17	signal for technological protection 17	Bit (0/1)->Word	Reading
SP18	lock of function of undervoltage protection	Bit (0/1)->Word	Reading
SP19	not used – 0	Bit (0/1)->Word	Reading
SP20	not used – 0	Bit (0/1)->Word	Reading
SP21	not used – 0	Bit (0/1)->Word	Reading
SP22	not used – 0	Bit (0/1)->Word	Reading
SP23	1 – MUZ signals operation of one of protections	Bit (0/1)->Word	Reading
SP24	not used – 0	Bit (0/1)->Word	Reading

Table 3. Binary Inputs Handled Together with Measurements (State of 16 Successive SPi Variables is Transferred)

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
SPW	actual status of variables SP1 (Bit 0) – SP16	WORD ->WORD	Reading
SPW	actual status of variables SP17 (Bit0) – SP24	WORD->WORD	Reading
	(Bits B8 – B15 are filled with zeroes)		

Table 4. Specific Variable in MUZRO.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
RP1	Number of not read events (operation of		Reading
RP2	event code (1-22) if RP1 ! = 0		Reading

Table 5. Rated Values and Settings of Protections.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
Z1	Voltage Uzn	Byte3<->Float	Read/Write
Z2	Current Izn	Byte3<->Float	Read/Write
Z3	Utilization factor of network Iw	Byte3<->Float	Read/Write
Z4	Coefficient kodc – current cutter	Byte3<->Float	Read/Write
Z5	Coefficient ki>> - short-circuit protection	Byte3<->Float	Read/Write
Z6	Coefficient ti>> - short-circuit protection	Byte3<->Float	Read/Write
Z7	Coefficient ki> - independent overload	Byte3<->Float	Read/Write
Z8	Coefficient ti> - independent overload	Byte3<->Float	Read/Write
Z9	Coefficient t1.2 - dependent overload protection	Byte3<->Float	Read/Write
Z10	Coefficient t1.5 - dependent overload protection	Byte3<->Float	Read/Write
Z11	Coefficient t2.0 - dependent overload protection	Byte3<->Float	Read/Write
Z12	Coefficient t3.0 - dependent overload protection	Byte3<->Float	Read/Write
Z13	Coefficient t6.0 - dependent overload protection	Byte3<->Float	Read/Write
Z14	Coefficient ta - dependent overload protection	Byte3<->Float	Read/Write
Z15	Coefficient Ii0> - ground-fault protection	Byte3<->Float	Read/Write
Z16	Coefficient ti0> - ground-fault protection	Byte3<->Float	Read/Write
Z17	Coefficient ku< - undervoltage protection	Byte3<->Float	Read/Write
Z18	Coefficient tu< - undervoltage protection	Byte3<->Float	Read/Write
Z19	Coefficient tt9 - technological protection 9	Byte3<->Float	Read/Write
Z20	Coefficient tt10 - technological protection 10	Byte3<->Float	Read/Write
Z21	Coefficient tt11 - technological protection 11	Byte3<->Float	Read/Write
Z22	Coefficient tt12 - technological protection 12	Byte3<->Float	Read/Write
Z23	Coefficient tt13 - technological protection 13	Byte3<->Float	Read/Write
Z24	Coefficient tt14 - technological protection 14	Byte3<->Float	Read/Write
Z25	Coefficient tt15 - technological protection 15	Byte3<->Float	Read/Write
Z26	Coefficient tt16 - technological protection 16	Byte3<->Float	Read/Write
Z27	Coefficient tt17 - technological protection 17	Byte3<->Float	Read/Write
Z28	Coefficient tiE - impulse time on output E	Byte3<->Float	Read/Write
Z29	Coefficient tiF - impulse time on output F	Byte3<->Float	Read/Write

Table 6. Binary Inputs Related to Settings of Protections.

Symb. Addr.	Variable in MUZRO		Type of Conversion	Allowed Operation
SZ1	on/off	- current cutter	Bit (0/1)<->Word	Read/Write
SZ2	on/off	- short-circuit protection	Bit (0/1)<->Word	Read/Write
SZ3	op/sign.	- overload protection,	Bit (0/1)<->Word	Read/Write
SZ4	on/off	- overload protection,	Bit (0/1)<->Word	Read/Write
SZ5	op/sign.	- overload protection,	Bit (0/1)<->Word	Read/Write
SZ6	on/off	- overload protection,	Bit (0/1)<->Word	Read/Write
SZ7	op/sign.	- ground-fault protection	Bit (0/1)<->Word	Read/Write
SZ8	on/off	- ground-fault protection	Bit (0/1)<->Word	Read/Write
SZ9	op/sign.	- undervoltage protection	Bit (0/1)<->Word	Read/Write
SZ10	on/off	- undervoltage protection	Bit (0/1)<->Word	Read/Write
SZ11	op/sign.	- technological protection 9	Bit (0/1)<->Word	Read/Write
SZ12	dep./indep.	- technological protection 9	Bit (0/1)<->Word	Read/Write
SZ13	op/sign.	- technological protection 10	Bit (0/1)<->Word	Read/Write
SZ14	dep./indep.	- technological protection 10	Bit (0/1)<->Word	Read/Write
SZ15	op/sign.	- technological protection 11	Bit (0/1)<->Word	Read/Write
SZ16	dep./indep.	- technological protection 11	Bit (0/1)<->Word	Read/Write
SZ17	op/sign.	- technological protection 12	Bit (0/1)<->Word	Read/Write
SZ18	dep./indep.	- technological protection 12	Bit (0/1)<->Word	Read/Write
SZ19	op/sign.	- technological protection 13	Bit (0/1)<->Word	Read/Write
SZ20	dep./indep.	- technological protection 13	Bit (0/1)<->Word	Read/Write
SZ21	op/sign.	- technological protection 14	Bit (0/1)<->Word	Read/Write
SZ22	dep./indep.	- technological protection 14	Bit (0/1)<->Word	Read/Write
SZ23	op/sign.	- technological protection 15	Bit (0/1)<->Word	Read/Write
SZ24	dep./indep.	- technological protection 15	Bit (0/1)<->Word	Read/Write
SZ25	op/sign.	- technological protection 16	Bit (0/1)<->Word	Read/Write
SZ26	dep./indep.	- technological protection 16	Bit (0/1)<->Word	Read/Write
SZ27	op/sign.	- technological protection 17	Bit (0/1)<->Word	Read/Write
SZ28	dep./indep.	- technological protection 17	Bit (0/1)<->Word	Read/Write

Table 7. Variables Storing States of Events with Value.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
ZW8	Current cutter – phase 0	Bit (0/1)->Word	Read/Write
ZW9	Current cutter – phase 3	Bit (0/1)->Word	Read/Write
ZW10	Current cutter – phase 2	Bit (0/1)->Word	Read/Write
ZW11	Current cutter – phases 2 and 3	Bit (0/1)->Word	Read/Write
ZW12	Current cutter – phase 1	Bit (0/1)->Word	Read/Write
ZW13	Current cutter – phases 1 and 3	Bit (0/1)->Word	Read/Write
ZW14	Current cutter – phases 1 and 2	Bit (0/1)->Word	Read/Write
ZW15	Current cutter – phases 1, 2 and 3	Bit (0/1)->Word	Read/Write
ZW16	Short-circuit protection – phase 0	Bit (0/1)->Word	Read/Write
ZW17	Short-circuit protection – phase 3	Bit (0/1)->Word	Read/Write
ZW18	Short-circuit protection – phase 2	Bit (0/1)->Word	Read/Write
ZW19	Short-circuit protection – phases 2 and 3	Bit (0/1)->Word	Read/Write
ZW20	Short-circuit protection – phase 1	Bit (0/1)->Word	Read/Write
ZW21	Short-circuit protection – phases 1 and 3	Bit (0/1)->Word	Read/Write
ZW22	Short-circuit protection – phases 1 and 2	Bit (0/1)->Word	Read/Write
ZW23	Short-circuit protection – phases 1, 2 and 3	Bit (0/1)->Word	Read/Write
ZW24	Independent overload protection – phase 0	Bit (0/1)->Word	Read/Write
ZW25	Independent overload protection – phase 3	Bit (0/1)->Word	Read/Write
ZW26	Independent overload protection – phase 2	Bit (0/1)->Word	Read/Write
ZW27	Independent overload protection – phases 2 and 3	Bit (0/1)->Word	Read/Write
ZW28	Independent overload protection – phase 1	Bit (0/1)->Word	Read/Write
ZW29	Independent overload protection – phases 1 and 3	Bit (0/1)->Word	Read/Write
ZW30	Independent overload protection – phases 1 and 2	Bit (0/1)->Word	Read/Write
ZW31	Independent overload protection – phases 1, 2 and	Bit (0/1)->Word	Read/Write
ZW32	Dependent overload protection – phase 0	Bit (0/1)->Word	Read/Write
ZW33	Dependent overload protection – phase 3	Bit (0/1)->Word	Read/Write
ZW34	Dependent overload protection – phase 2	Bit (0/1)->Word	Read/Write
ZW35	Dependent overload protection – phases 2 and 3	Bit (0/1)->Word	Read/Write
ZW36	Dependent overload protection – phase 1	Bit (0/1)->Word	Read/Write
ZW37	Dependent overload protection – phases 1 and 3	Bit (0/1)->Word	Read/Write
ZW38	Dependent overload protection – phases 1 and 2	Bit (0/1)->Word	Read/Write
ZW39	Dependent overload protection – phases 1, 2 and 3	Bit (0/1)->Word	Read/Write
ZW40	Ground-fault protection	Bit (0/1)->Word	Read/Write
ZW64	Undervoltage protection – phase 0	Bit (0/1)->Word	Read/Write
ZW65	Undervoltage protection – phase 3	Bit (0/1)->Word	Read/Write
ZW66	Undervoltage protection – phase 2	Bit (0/1)->Word	Read/Write
ZW67	Undervoltage protection – phases 2 and 3	Bit (0/1)->Word	Read/Write
ZW68	Undervoltage protection – phase 1	Bit (0/1)->Word	Read/Write
ZW69	Undervoltage protection – phases 1 and 3	Bit (0/1)->Word	Read/Write
ZW70	Undervoltage protection – phases 1 and 2	Bit (0/1)->Word	Read/Write
ZW71	Undervoltage protection – phases 1, 2 and 3	Bit (0/1)->Word	Read/Write

Table 8. Variable Storing States of Text Events.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
ZT1	Short-circuit PDZ (accelerated protections)	Bit (0/1)->Word	Read/Write
ZT4	Failure of shutdown	Bit (0/1)->Word	Read/Write
ZT5	Failure of switching on	Bit (0/1)->Word	Read/Write
ZT7	Opening of remote control	Bit (0/1)->Word	Read/Write
ZT8	Closure of remote control	Bit (0/1)->Word	Read/Write
ZT38	Technological protection 9	Bit (0/1)->Word	Read/Write
ZT39	Technological protection 10	Bit (0/1)->Word	Read/Write
ZT40	Technological protection 11	Bit (0/1)->Word	Read/Write
ZT41	Technological protection 12	Bit (0/1)->Word	Read/Write
ZT 48	Technological protection 13	Bit (0/1)->Word	Read/Write
ZT49	Technological protection 14	Bit (0/1)->Word	Read/Write
ZT50	Technological protection 15	Bit (0/1)->Word	Read/Write
ZT51	Technological protection 16	Bit (0/1)->Word	Read/Write
ZT52	Technological protection 17	Bit (0/1)->Word	Read/Write
ZT116	Bad clock setting	Bit (0/1)->Word	Read/Write
ZT117	Checksum error (MUZ failure)	Bit (0/1)->Word	Read/Write

Table 9. Control Variables.

Symb. Addr.	Variable in MUZRO	Type of Conversion	Allowed Operation
KS1	Quitting signals of protection activation (writing	Word->Word	Writing
	and zeroing statuses of all variables **ZTi** and **ZWi**		
	in internal driver buffer		
SW1	Opening (0) and closure of breaker (1)	Word->Word	Writing
KZ1	Zeroing statuses of all variables **ZTi** and **ZWi**	Word->Word	Writing
	in internal driver buffer (writing any number)		

Meanings of Abbreviations

On - protection switched on (1),
Off - protection switched off (0),
Op - protection causes opening of a breaker (1),
Sygn - protection causes activation of a signalization (0),
Dep. - protection is active when a breaker is closed (0),
Indep. - protection is active independently.

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