



General manufacturing monitoring

Automatic Follow-up of Operational Interruption in
Production

General Specification for PLC-signals

DUGA PLC-signals Matrix Version: 20

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Introduction

This specification describes the function of the PLC signals independent of manufacturer of the PLC.

If possible the suggested names of the variables must be followed. If the actual PLC system or the choice of interface not permits the suggested names, other names could be used. If only eight letters are allowed it's suggested to leave out the first letter "m" in the suggested names below.

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1 List of changes from previous versions.

Date	Version	Description	Revised by
2008-09-16	1_0_0	New document	Kristoffer Nilsson
2009-01-28	1_0_1	Correction	Kristoffer Nilsson
2009-03-19	1_0_2	Correction variable name	Kristoffer Nilsson
2009-03-30	1_0_3	Updated Dry Run	Kristoffer Nilsson
2010-06-02	1_1_0	Correction of description	DUGA Team
2011-02-28	1_1_1	Correction of description mWaitOut	Kristoffer Nilsson



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2 Description PLC-variables

2.1 mAuto - Auto mode is selected.

mAuto : BOOL
- Automatic mode is selected. It is possible to start production in this mode.

2.2 mActive - Process is active.

mActive : BOOL

- It is important that this signal remains high during the active processing cycle.
- mActive =1 during processing or warm-up cycle (mDryRun=1).

Example:



2.3 mLoad - Part change is active.

Work Area type: Machine/ Loading equipment

mLoad : BOOL
- Part change is active.

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2.4 mWait - Waiting.

mWait : BOOL

mWait=1 when mLoad=0 and mActive=0

Example:

"Cycle is active" mLoad mActive mWait
 ---| |-----|/|-----|/|------()---

2.5 mError - Alarm on work area.

mError : BOOL

- An alarm which has stopped the process or will stop the process at the end of the cycle.
- mError=1 when the alarm appears and the operation is in automatic mode, mAuto=1. It should be remained set until the alarm is cleared, even if the mode changes to manual.
- mError=1 and mWait must not exist at the same time

2.6 mWarning - Warning on work area.

mWarning : BOOL

- mWarning=1 when a warning exist in the work area.

2.7 mPartIn - A new part is loaded in to the work area.

mPartIn : BOOL

- Part is loaded in to the work area. It should be a pulse. Should not be sent if the part has been reloaded.

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2.8 mPartOut - A finished part leaves the work area.

mPartOut : BOOL

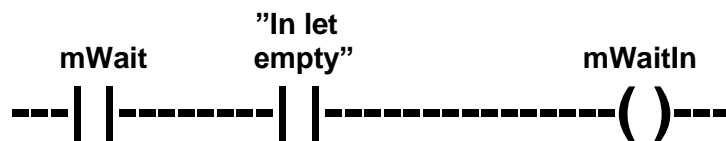
- Part leaves the work area. It should be a pulse when a finished part leaves the work area. Should not be sent if the same part has been unloaded twice.

2.9 mWaitIn - Work area is starved.

mWaitIn :BOOL

- Work area is waiting, no part available

Example:



2.10 mWaitOut - Work area is blocked.

mWaitOut :BOOL

- Work area is waiting, part can't be unloaded

Example:



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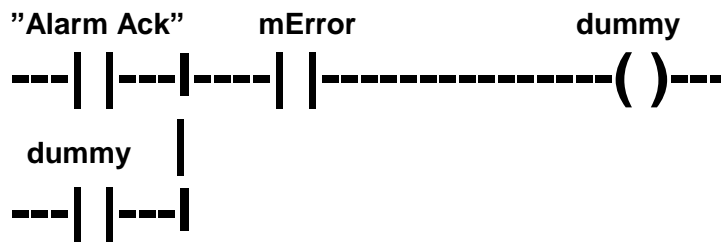
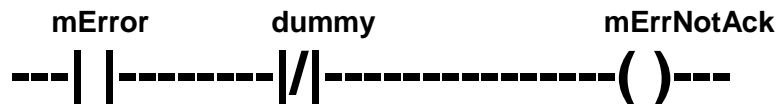
2.11 mErrNotAck - Alarm is active and not acknowledged.

mErrNotAck : BOOL

- mErrNotAck should not be set if a new alarm occurs when mError=1.
- mErrNotAck=1 when mError=1.
- mErrNotAck=0 when mError=1 and when operator have tried to erased the alarm then the alarm is acknowledged.



Example:



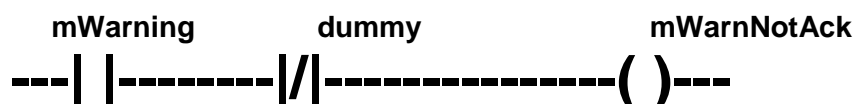
2.12 mWarnNotAck - Warning is active and not acknowledged.

mWarnNotAck : BOOL

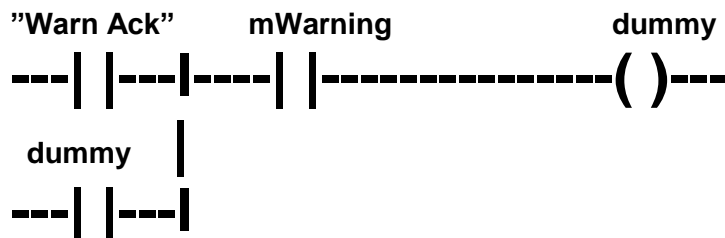
- Should not be set if a new warning occurs when mWarning=1.
- mWarnNotAck =1 when mWarning=1.
- mWarnNotAck=0 when mWarning=1 and when operator have tried to erased the warning then the warning is acknowledged.



Example:



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2.13 mHelpWait -Waiting for Help service

mHelpWait :BOOL

- When "Help" is pushed to call for help, mHelpWait=1, measures waiting for service. When mHelpAct=1 → mHelpWait=0.

2.14 mHelpAct -Help service starts to work

mHelpAct :BOOL

- mHelpAct=1 when service starts, mHelpWait=0.
When service is finished then mHelpAct=0.

2.15 mOvrNot100 - Override is NOT set to 100 percent.

mOvrNot100 : BOOL
- Override is NOT set to 100 percent.

2.16 mDryRun - Sub op mode: continuous cycle without parts (warm up).

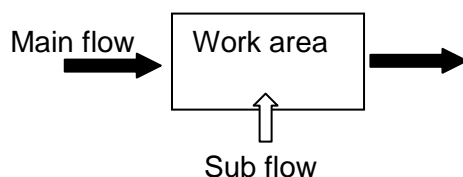
mDryRun : BOOL
- Sub op mode: continuous cycle without parts or warm up cycle and there are no parts in the work area.

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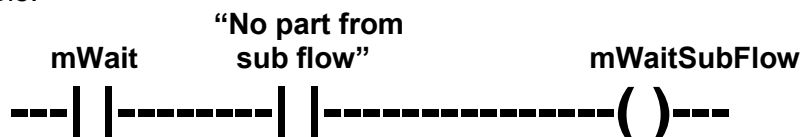
2.17 mWaitSubflow - Work area is waiting for part from Sub flow

mWaitSubflow :BOOL

- Work area is waiting for part from a sub flow, e.g. the work area is waiting for internal material.



Example:



2.18 mWaitChk- Work area is waiting because there is a part that needs to be checked.

mWaitChk :BOOL

- Work area is waiting because there is a part that needs to be checked.

Example:

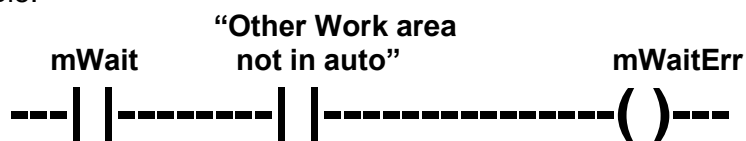


2.18 mWaitErr - Waiting, disabled by other work area.

mWaitErr :BOOL

- Waiting, disabled by other work area.

Example:



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2.19 mSingCyc - Operation mode: single cycle or stop at end of cycle.

mSingCyc : BOOL
= Operating mode: single cycle or stop at end of cycle is active.

2.20 mPrtCs - There is a part on the control station.

mPrtCs : BOOL
- There is a part on the control station.

VariantBitXX uses to identify different types/articles that will be loaded into the Work area.

These signals sends to DUGA when mPartIn=1, binary code.

NOTE! *Variant bit should not be sent if it is possible to send variant as integer.*

2.21 mVariantBit1 - Part type Bit 1

mTypBit1 :BOOL
- Value 1

2.22 mVariantBit2 - Part type Bit 2

mTypBit2 :BOOL
- Value 2

2.23 mVariantBit4 - Part type Bit 4

mTypBit4 :BOOL
- Value 4

2.24 mVariantBit8 - Part type Bit 8

mTypBit8 :BOOL
- Value 8

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2.25 mVariantBit16 - Part type Bit 16

mTypBit16 :BOOL
- Value 16

2.26 mCountNr1 -Counter number1, counts e.g. parts in buffer 1

Only used for binary counters.

NOTE! Counter bit should not be sent if it is possible to send Counter as integer.

mCountNr1 :BOOL
- Buffer/counter, mCountNr1=1 when buffer/counter changes. The value in buffer/counter is the value from the variables mCount1 to mCount16.

2.27 mCountNr2 -Counter number 2, counts e.g. parts in buffer 2

Only used for binary counters.

NOTE! Counter bit should not be sent if it is possible to send Counter as integer.

mCountNr2 :BOOL
- Buffer/counter, mCountNr2=1 when buffer/counter changes. The value in buffer/counter is the value from the variables mCount1 to mCount16.

NOTE! mCountNr1 and mCountNr2 can't be set to 1 at same time.

2.28 mCount1 -Counter 1 nr of parts in buffer

mCount1 :BOOL
- Value 1

2.29 mCount2 -Counter 2 nr of parts in buffer

mCount2 :BOOL
- Value 2

2.30 mCount4 -Counter 4 nr of parts in buffer

mCount4 :BOOL
- Value 4



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2.31 mCount8 -Counter 8 nr of parts in buffer

mCount8 :BOOL
- Value 8

2.32 mCount16 -Counter 16 nr of parts in buffer

mCount16 :BOOL
- Value 16

2.33 mCount32 -Counter 32 nr of parts in buffer

mCount16 :BOOL
- Value 32

2.34 mMessageX -Message: 1 to 8

mMessage1 :BOOL
- The signal is used to trig a message.

mMessage2
mMessage3
mMessage4
mMessage5
mMessage6
mMessage7
mMessage8

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3 INTEGERS

3.1 iManualcode

Manual code comes as an Integer.

3.2 iCountNr1

Alt1: Counter1 = Set actual counter value for counter 1.

Alt2: Counter1= CounterID, (define which counter to read).

3.3 iCountNr2

Alt1: Counter2 = Set actual counter value for counter 2.

Alt2: Counter2= Counter Value, number of e.g. parts in buffer regarding to CounterID (Counter1).

3.4 iVariant

Which variant (product type) will be processed in the work area, sends to DUGA when mPartIn=1.

3.5 iWaitSubflow

Describes which sub flow that the machine is waiting for, sends to DUGA when mWaitSubflow=1.

Integer	Binary code				
iWaitSubflow Value	Subflow 5 bit16	Subflow 4 bit8	Subflow 3 bit4	Subflow 2 bit2	Subflow 1 bit1
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0

3.6 iAlarmID

NOTE! The alarm number must exist when mError turns to 1.



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4 STRINGS

4.1 sAlarmText

- Alt1: Alarm text, Max 80 characters
NOTE! The alarm text must exist when mError turns to 1.
- Alt2: Alarm ID, max 16 characters
NOTE! The alarm number must exist when mError turns to 1.