VM15

Signals interface

Installer manual
VM15 – Signals interface

9UMEN1521-1200
Release: 210707

VM15 Signals interface

1. System

1.1. Introduction

The control of the preliminary conditions is performed by the system and depends on the parameters setup. Some of these conditions are associated with digital signals on connectors / Profibus DP / ProfiNET.

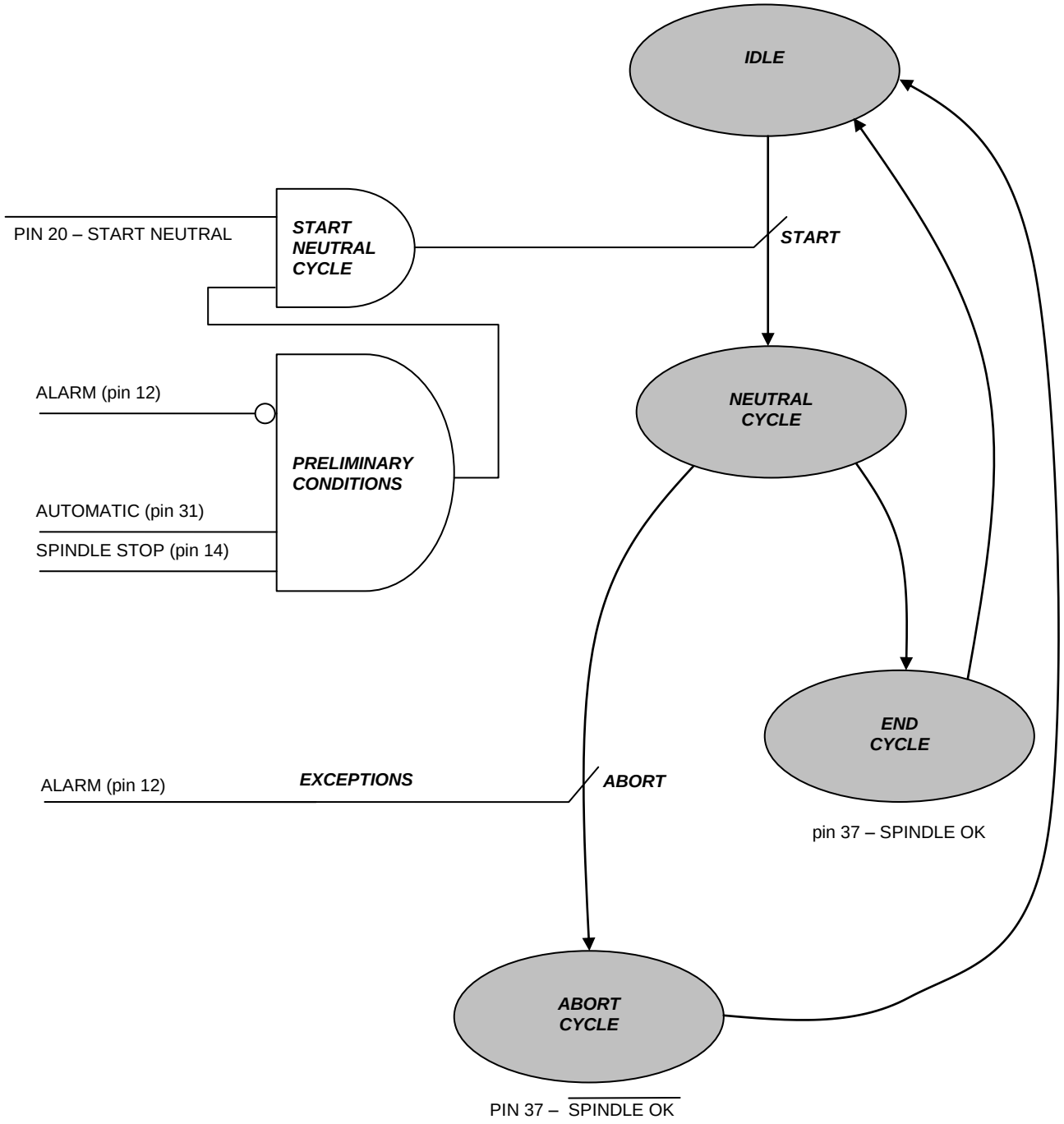
For details about the pin-out of digital I/O connectors refer to the document “9UMEN1506-1200 YYMMDD Components v120 En.pdf”

For details about the parameter setup related with the digital interface to the document “9UMEN1505-1200 YYMMDD Parameter Setup v120 En.pdf”

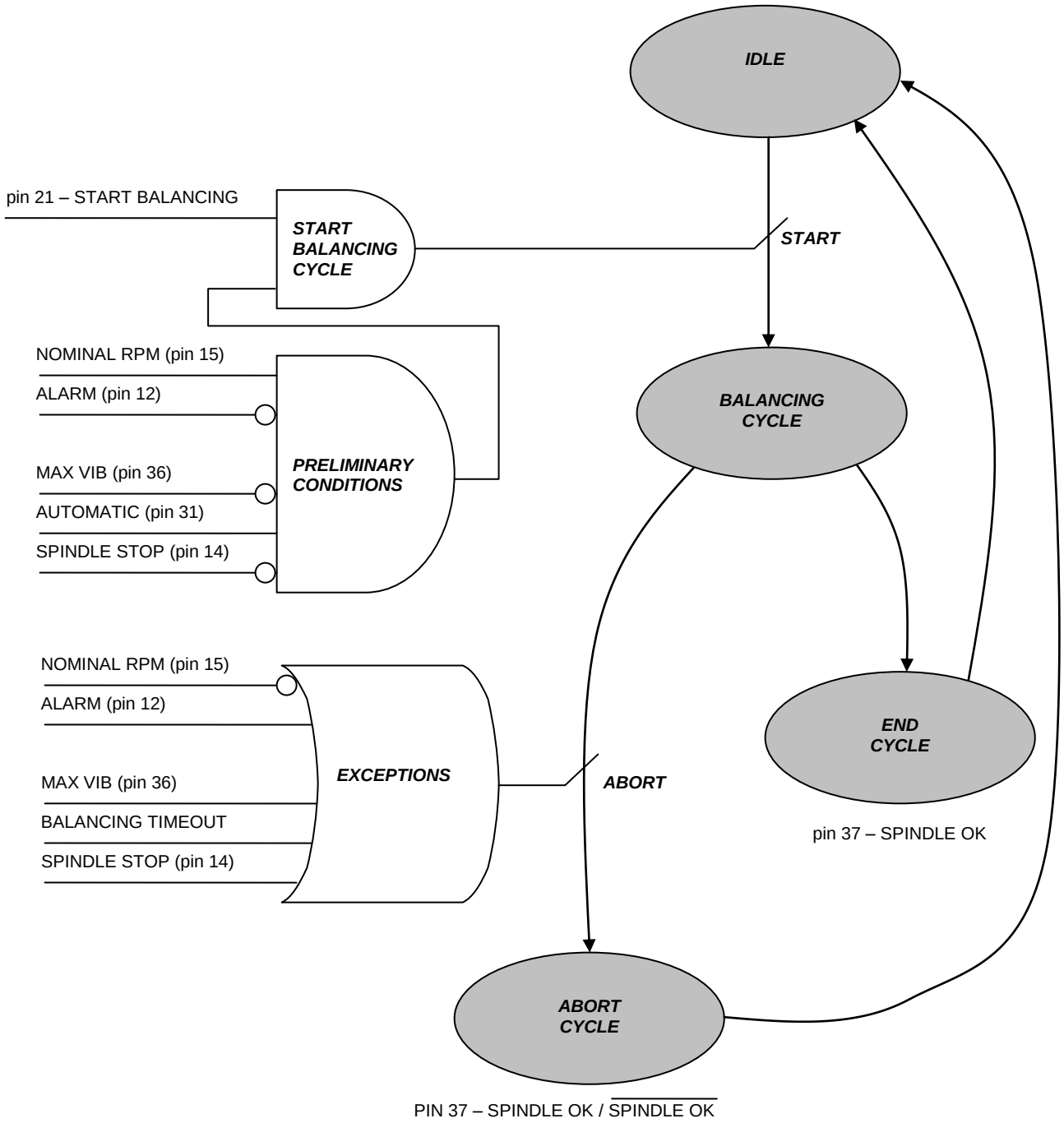
2. Balancer [BN type]

2.1. Preliminary

2.1.1. Neutral cycle state diagram



2.1.2. Automatic balancing cycle state diagram



2.2. Signals logic on B1 connector

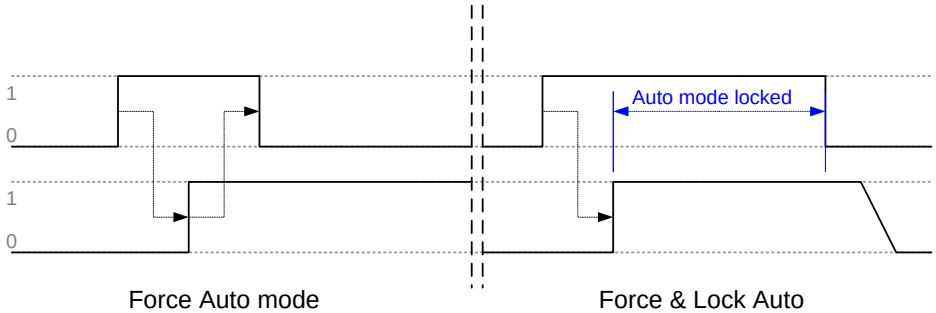
Following sections are arranged as follow:

- *Without handshake*: disabling the handshake management parameter (SETUP → INPUT OUTPUT → Handshake management = OFF), commands sent to the system, do not produce output signals as a reply. Waiting time is required to correctly process the command.
  This configuration is available for compatibility with previous machine interfaces.
- *With handshake*: enabling the handshake management parameter (SETUP → INPUT OUTPUT → Handshake management = ON), commands sent to the system, produce output signals which are sent to the CN as a reply. In this way, the CN receives an immediate feedback of correctly processed command. This configuration is strongly recommended.

2.2.1. Without handshake - (for compatibility with previous interfaces - default)

2.2.1.1. Automatic mode

Automatic mode
AUTOMATIC LOCK B1.6
AUTOMATIC MODE B1.31

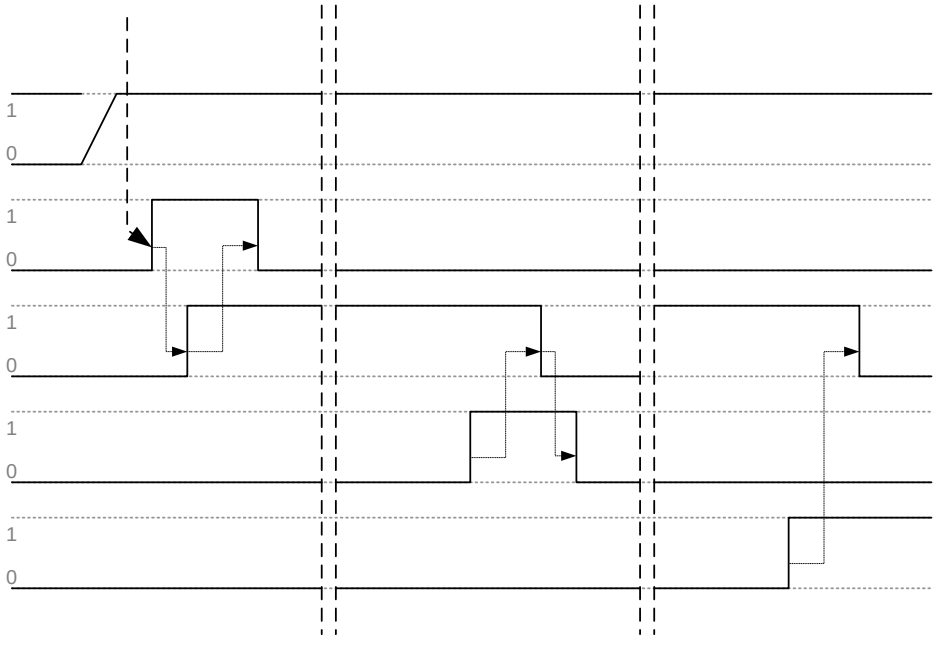


Force Auto mode
(Unlock auto mode)

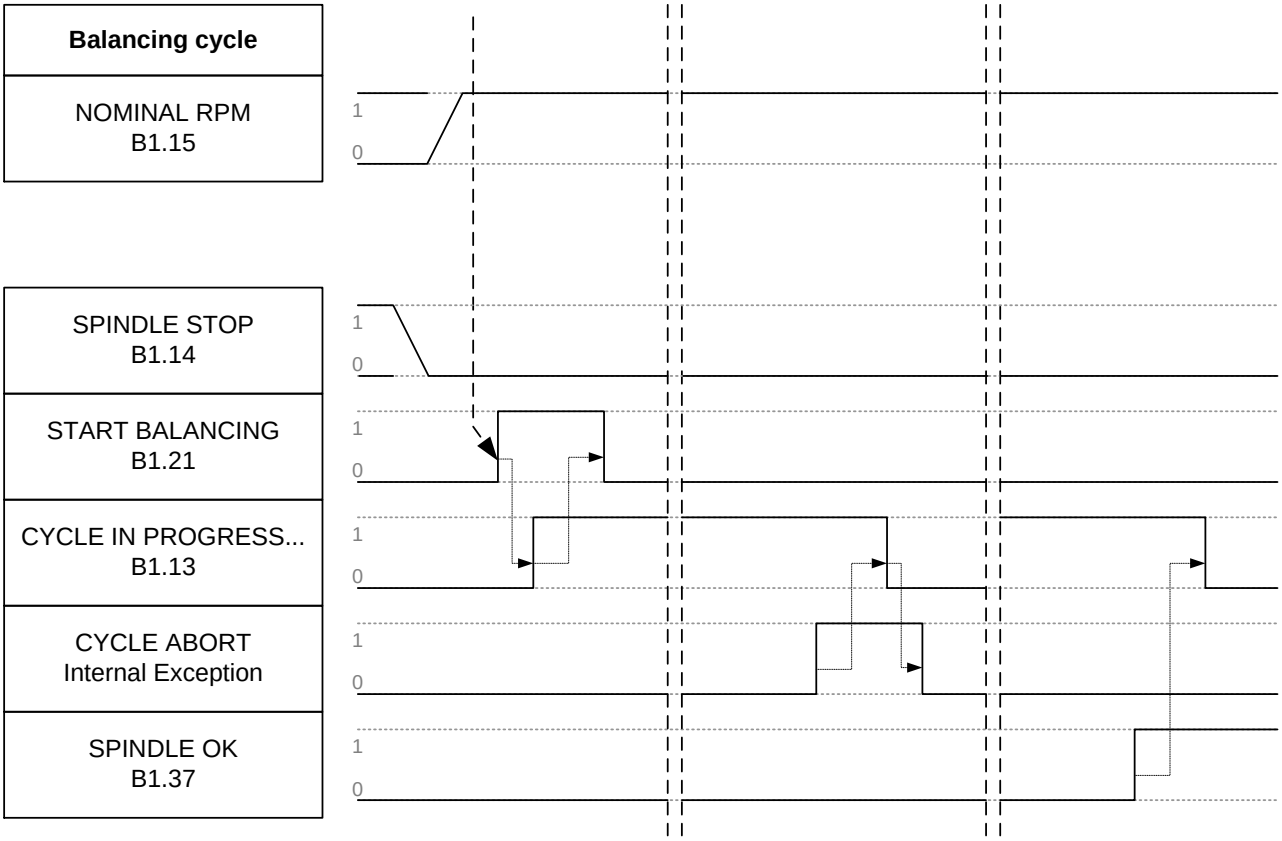
Force & Lock Auto
mode

2.2.1.2. Neutral cycle

Neutral cycle
SPINDLE STOP B1.14
START NEUTRAL B1.20
CYCLE IN PROGRESS... B1.13
CYCLE ABORT Internal Exception
SPINDLE OK B1.37



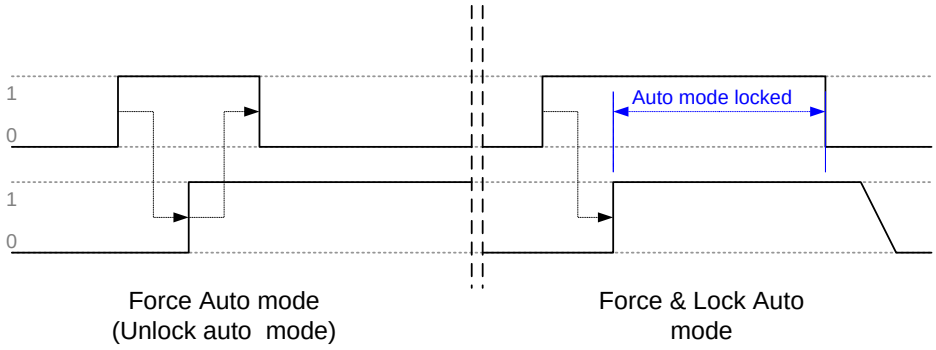
2.2.1.3. Automatic balancing cycle



2.2.2. With handshake – (strongly recommended)

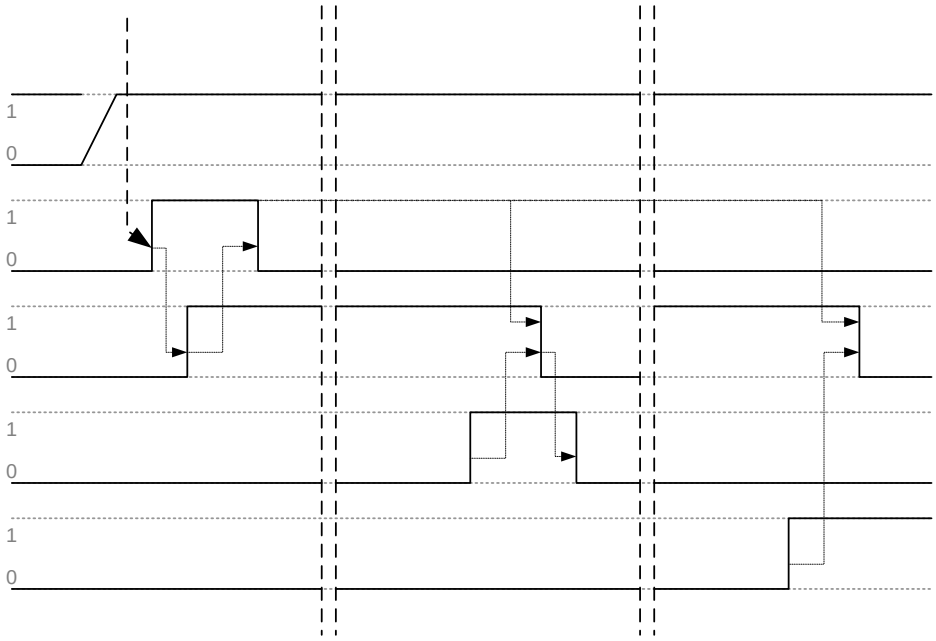
2.2.2.1. Automatic mode

Automatic mode
AUTOMATIC LOCK B1.6
AUTOMATIC MODE B1.31

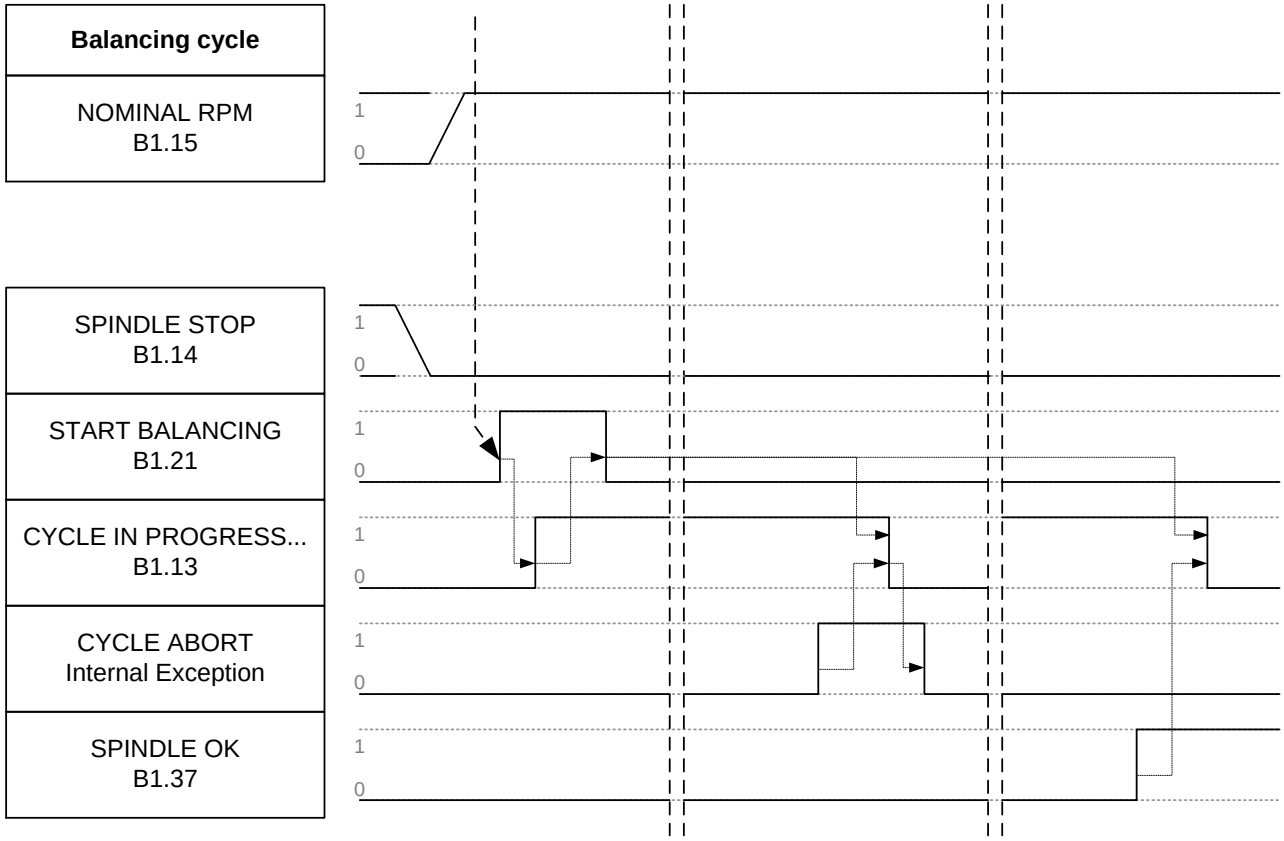


2.2.2.2. Neutral cycle

Neutral cycle
SPINDLE STOP B1.14
START NEUTRAL B1.20
CYCLE IN PROGRESS... B1.13
CYCLE ABORT Internal Exception
SPINDLE OK B1.37



2.2.2.3. Automatic balancing cycle



3. Touch Detector [TD type]

3.1. Signals logic on D1 and D2 connectors

Following sections are arranged as follow:

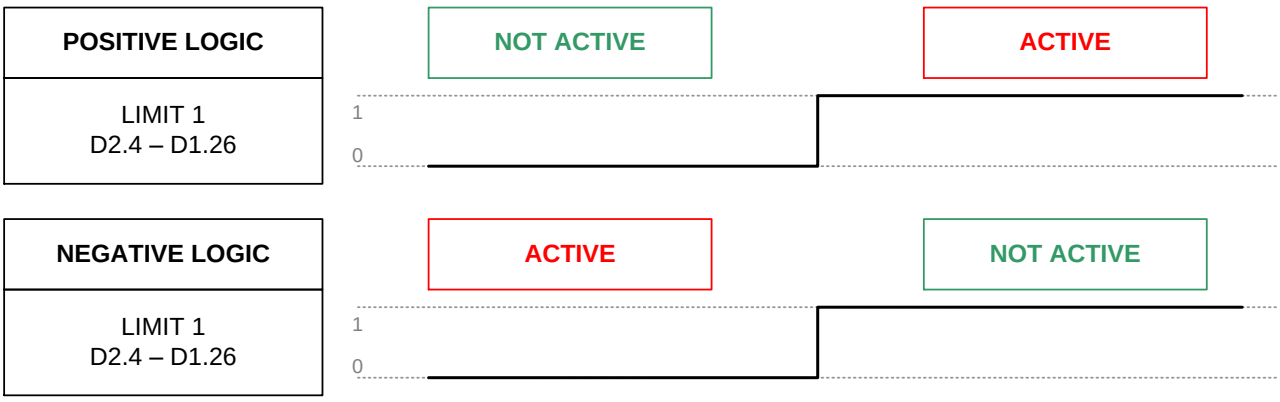
- *Without handshake*: disabling the handshake management parameter (SETUP → INPUT OUTPUT → Handshake management = OFF), commands sent to the system, do not produce output signals as a reply. Waiting time is required to correctly process the command.
  This configuration is available for compatibility with previous machine interfaces.
- *With handshake*: enabling the handshake management parameter (SETUP → INPUT OUTPUT → Handshake management = ON), commands sent to the system, produce output signals which are sent to the CN as a reply. In this way, the CN receives an immediate feedback of correctly processed command. This configuration is strongly recommended.

3.1.1. Without handshake - (for compatibility with previous interfaces - default)

3.1.1.1. Automatic mode

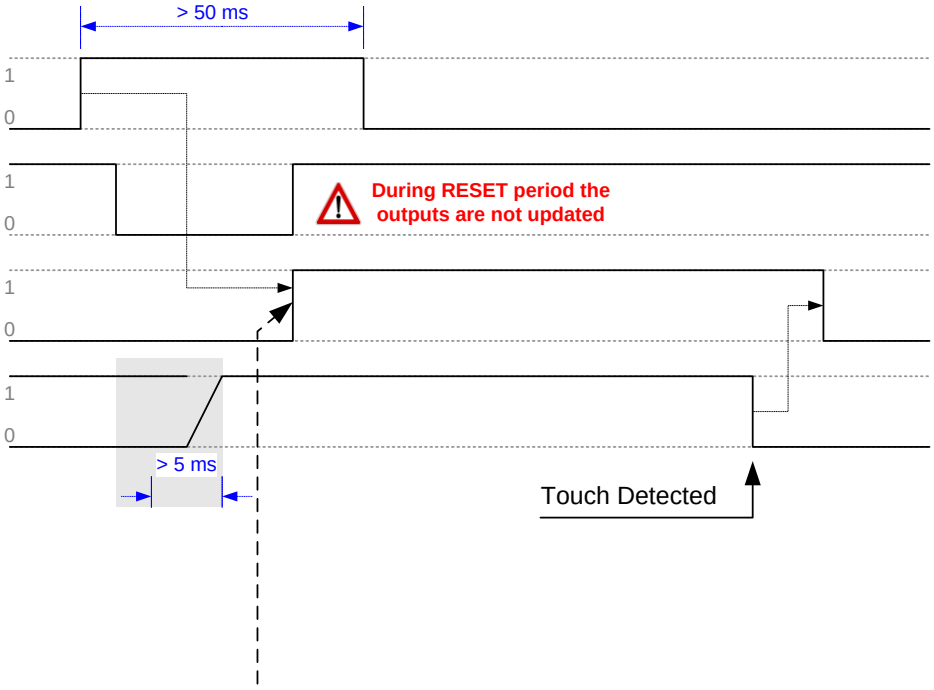
See paragraph 1.

3.1.1.2. Limit 1, 2, 3 and 4 signalling

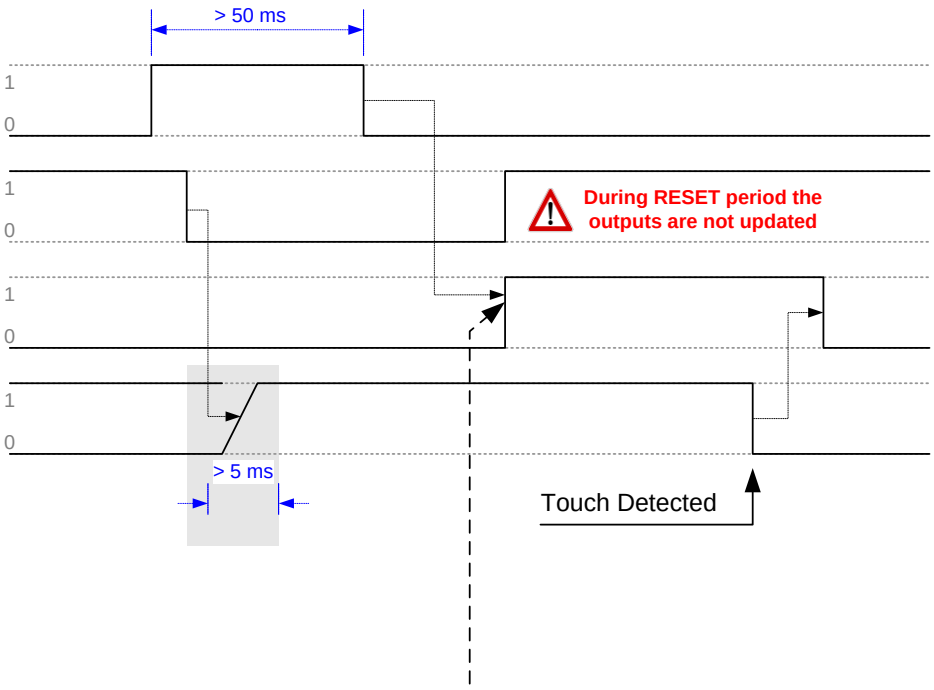


3.1.1.3. Reset

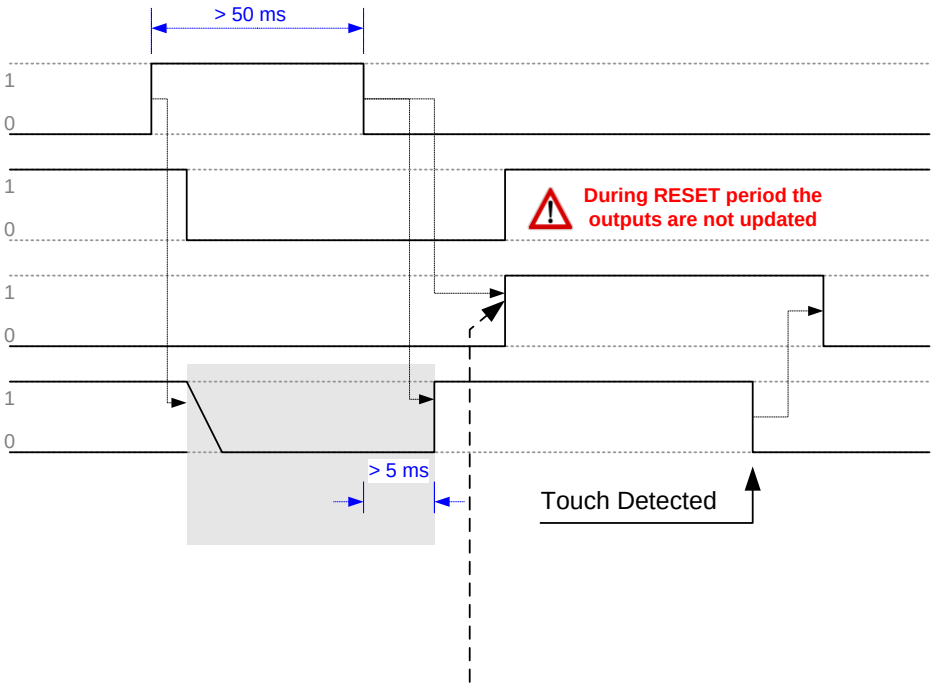
Case 1 RESET = EDGE
RESET D2.1
RESET IN PROGRESS... D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7



Case 2 RESET = STATUS
RESET D2.1
RESET IN PROGRESS... D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7

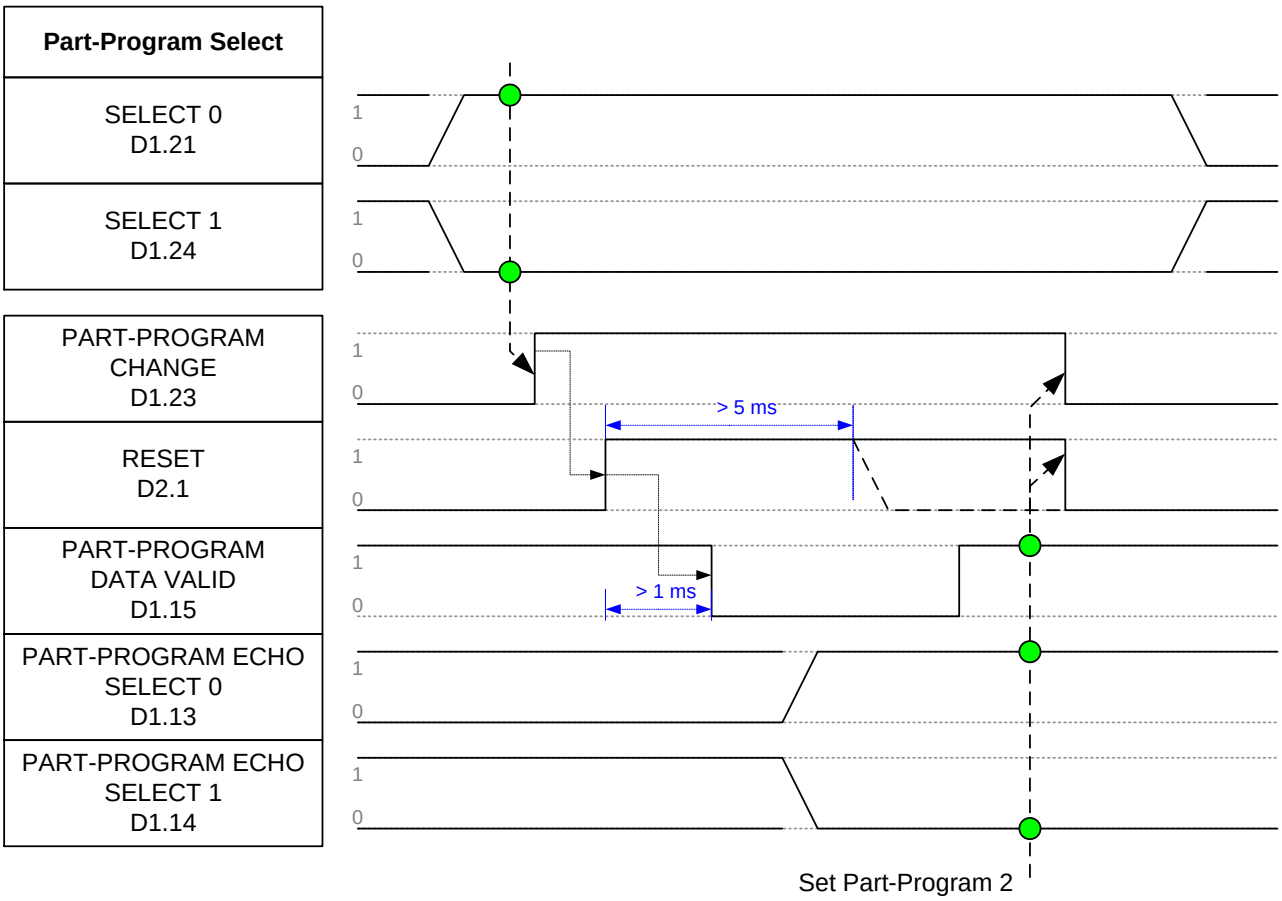


Case 3 RESET = STATUS+TEST
RESET D2.1
RESET IN PROGRESS... D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7



3.1.1.4. Part-Program change (Select 0, 1) – Example PP1 > PP2

Part-Program No.	Select 0	Select 1
1	0	0
2	1	0
3	0	1
4	1	1

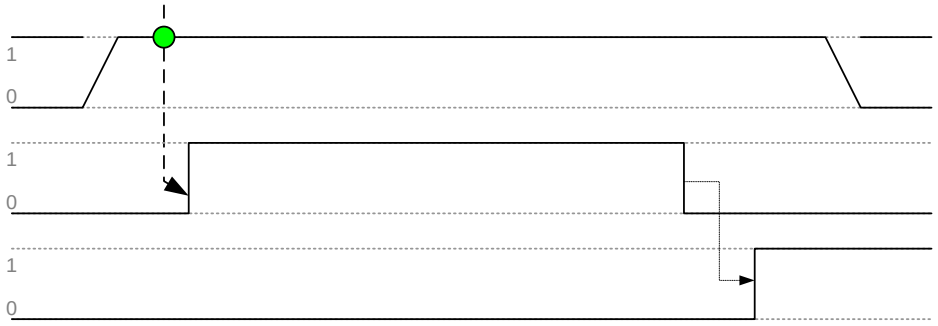


3.1.1.5. VM20 (like) - Part-Program change (Select 0) – Example PP1 > PP2

It needs to be activated by TD card options as follow:
Options → HW configuration → RESET MODE VM20 LIKE = ON

Part-Program No.	Select 0
1	0
2	1

Part-Program Select VM20 LIKE
SELECT 0 D2.2
RESET A D2.1
PART-PROGRAM ECHO SELECT 0 D2.7



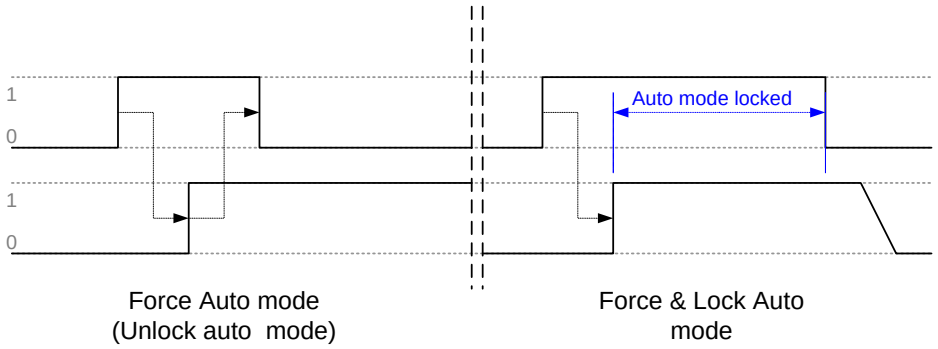
3.1.1.6. Envelope

See section 3.1.2.5

3.1.2. With handshake – (strongly recommended)

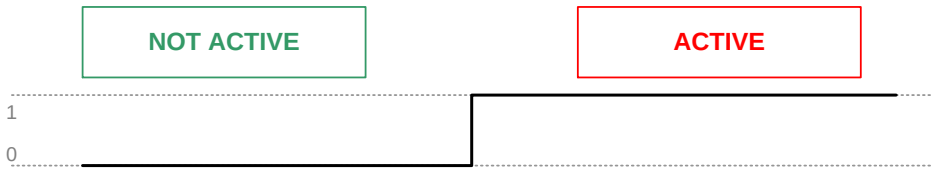
3.1.2.1. Automatic mode

Automatic mode
AUTOMATIC LOCK D1.6
AUTOMATIC MODE D1.36

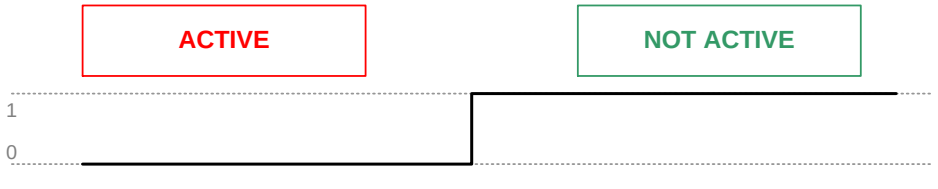


3.1.2.2. Limit 1, 2, 3 and 4 signalling

POSITIVE LOGIC
LIMIT 1 D2.4

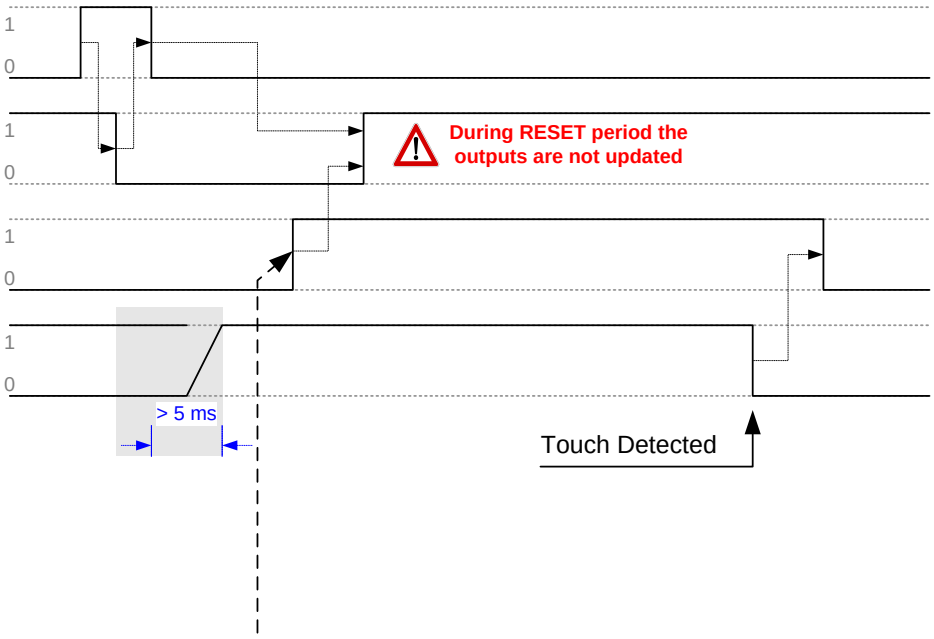


NEGATIVE LOGIC
LIMIT 1 D2.4

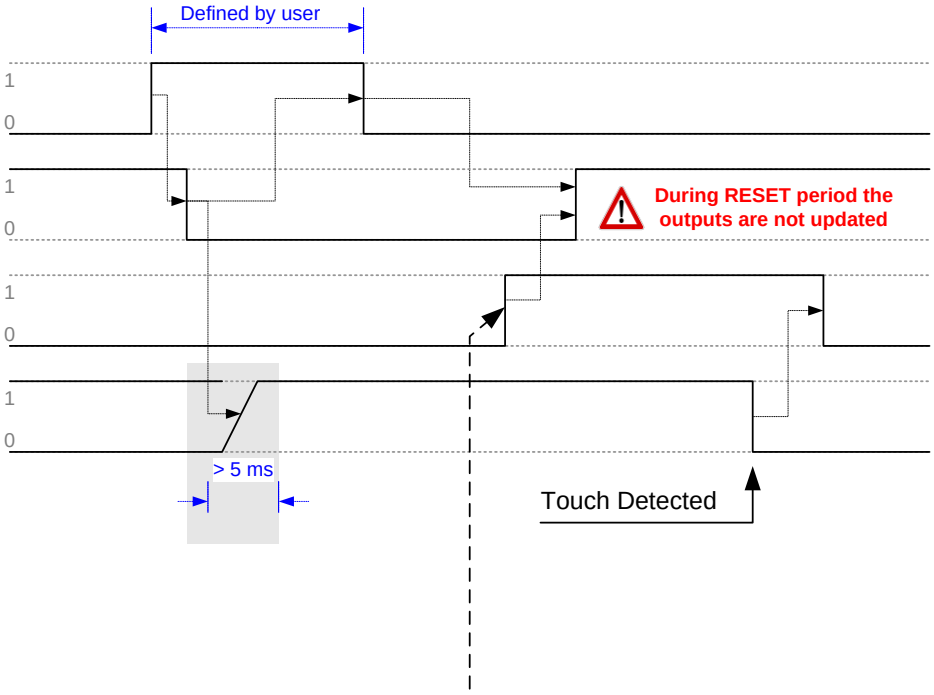


3.1.2.3. Reset

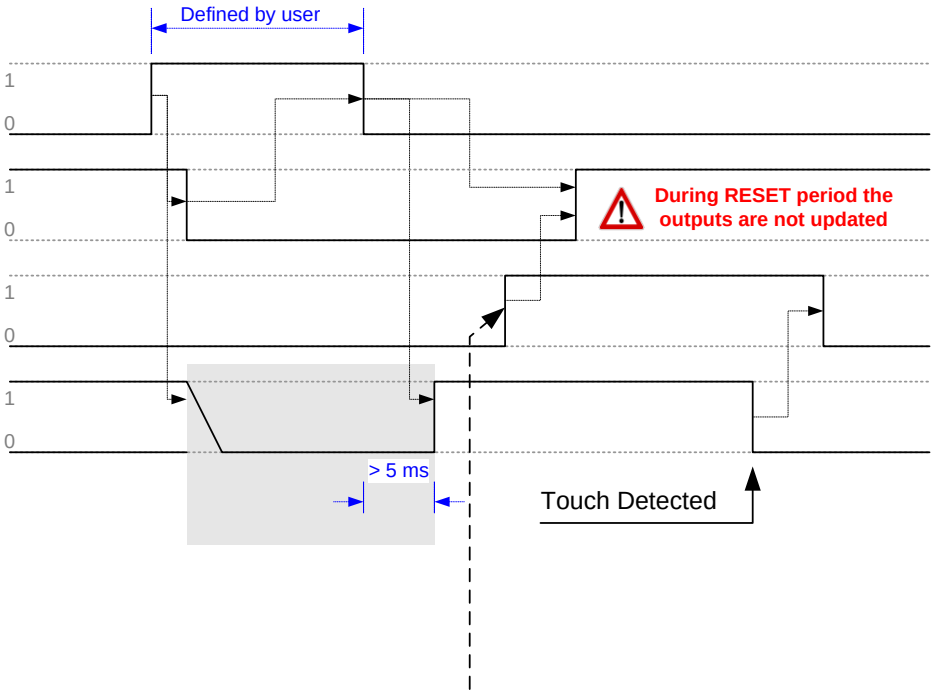
Case 1 RESET = EDGE
RESET A D2.1
RESET IN PROGRESS... A D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7



Case 2 RESET = STATUS
RESET D2.1
RESET IN PROGRESS... D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7

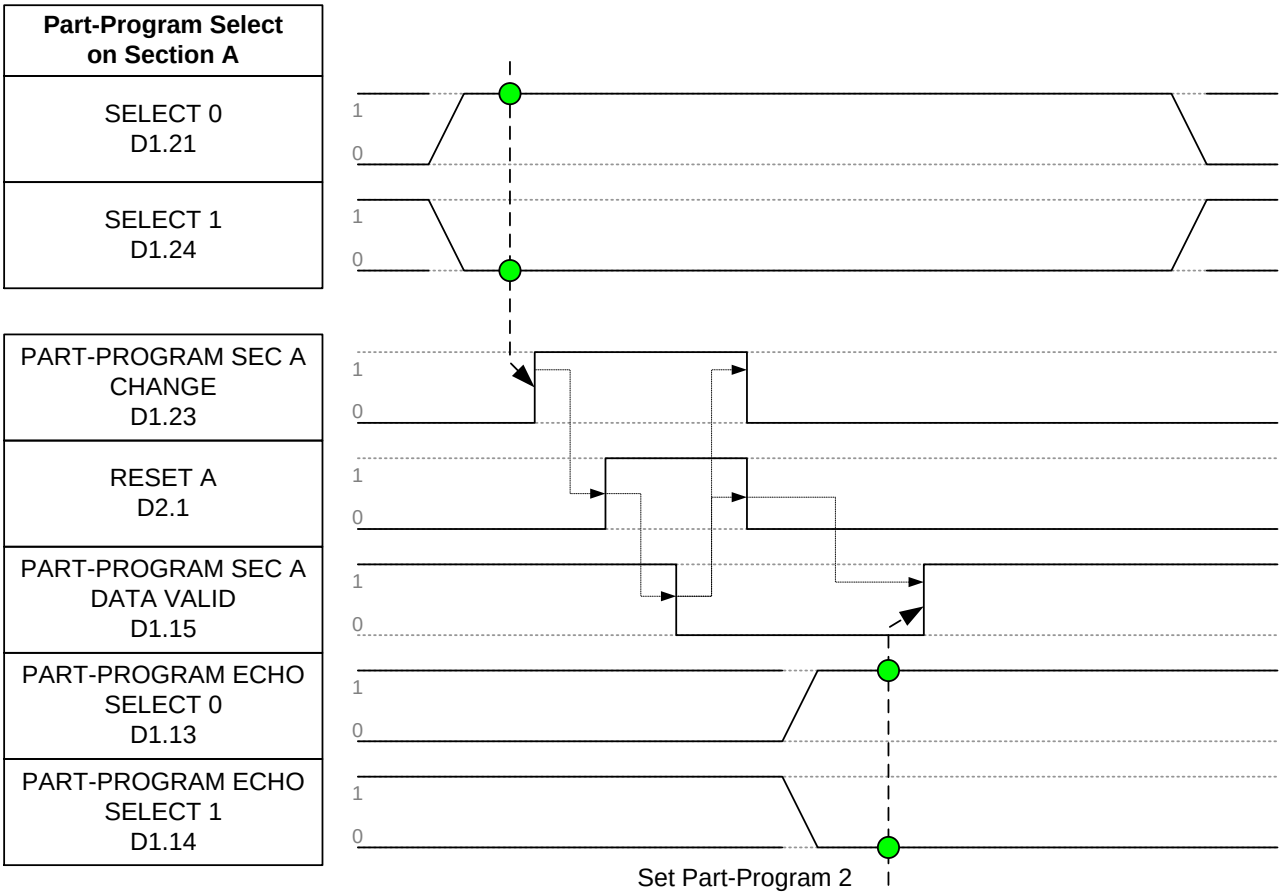


Case 3 RESET = STATUS+TEST
RESET D2.1
RESET IN PROGRESS... D2.7
CYCLE IN PROGRESS... D2.5 – D2.6 – D2.7 - D1.12
LIMIT 1 D2.4
LIMIT 2 D2.5
LIMIT 3 D2.6
LIMIT 4 D2.7



3.1.2.4. Part-Program change (Select 0, 1) – Example PP1 > PP2

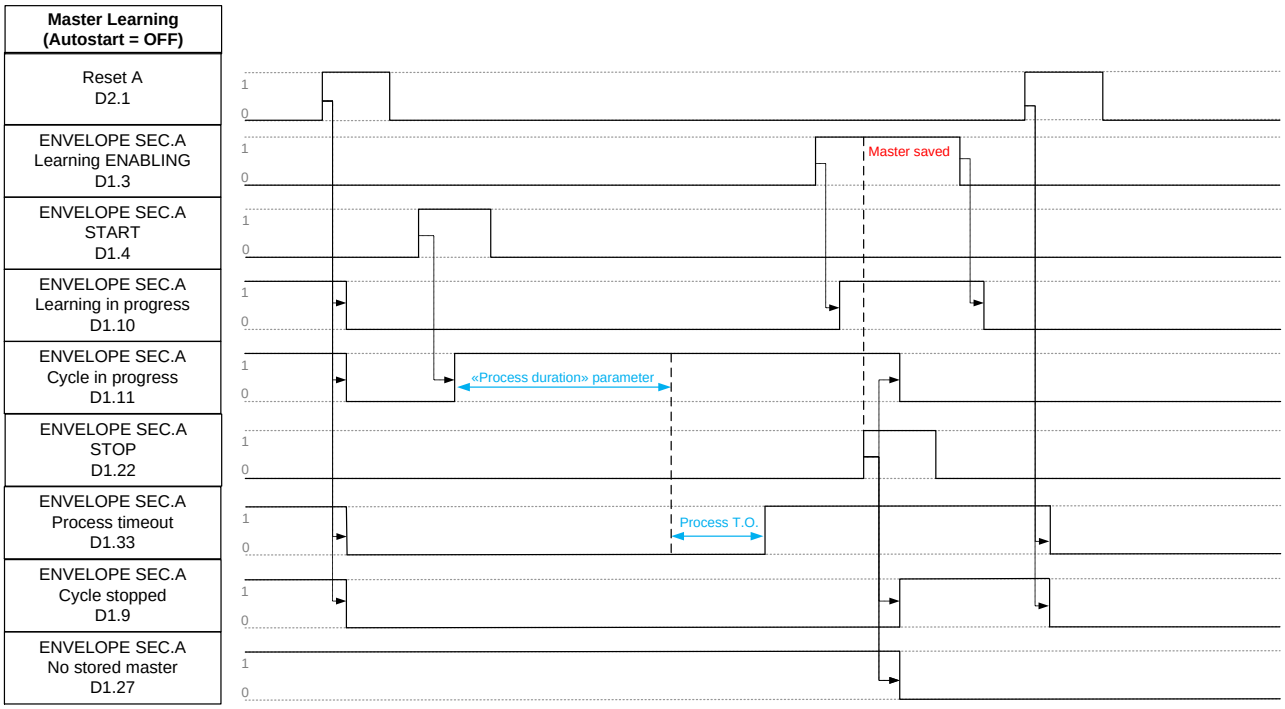
Part-Program No.	Select 0	Select 1
1	0	0
2	1	0
3	0	1
4	1	1



3.1.2.5. Envelope

3.1.2.5.1 Master learning (with Self learning duration = OFF and Autostart = OFF)

With Self learning duration = OFF, process duration specification is required (see parameter setup for further details).



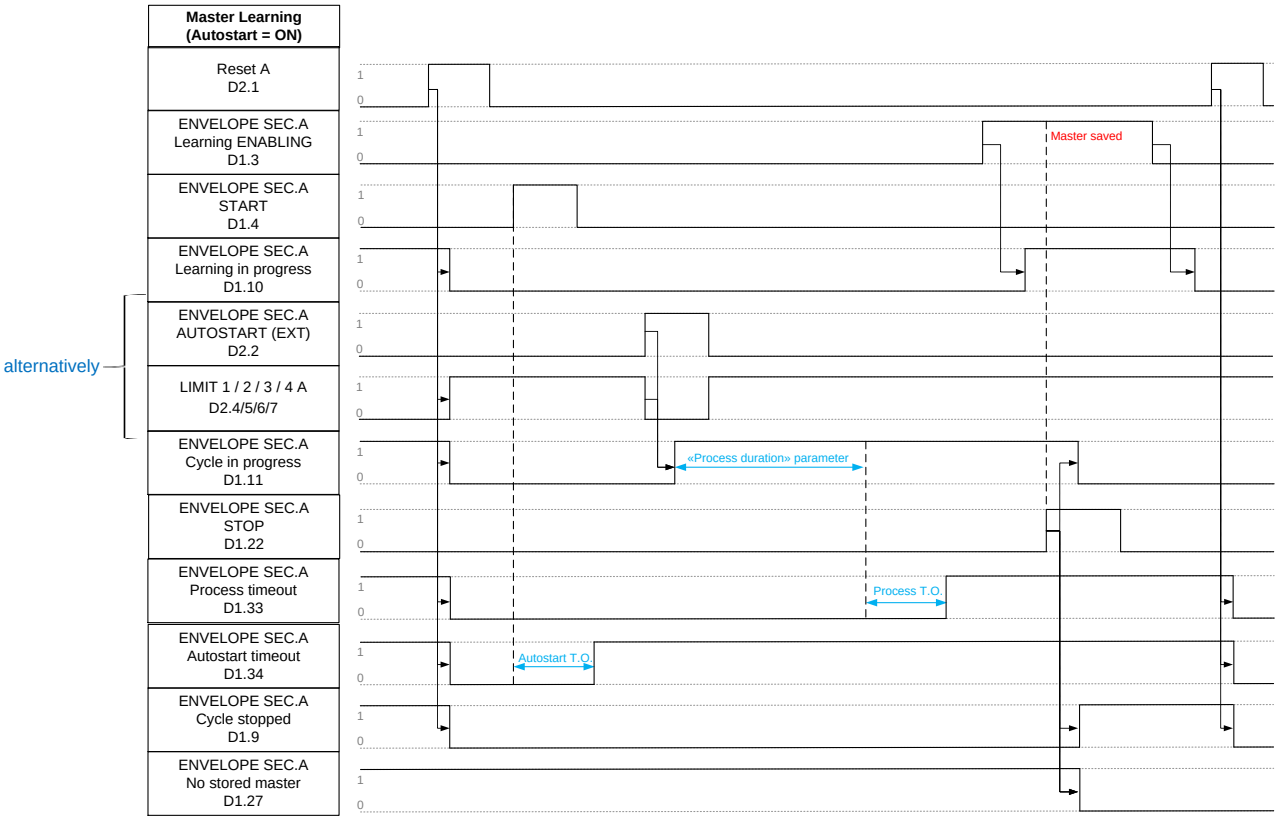
Note:

- Process duration is defined by user according with duration of the process to analyze.
- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after process duration plus timeout value both defined on related parameters.

3.1.2.5.2 Master learning (with Self learning duration = OFF and Austostart = ON)

With Self learning duration = OFF, process duration specification is required (see parameter setup for further details).
The process starts using alternatively:

a. Autostart external signal
b. Limit 1, 2, 3, 4

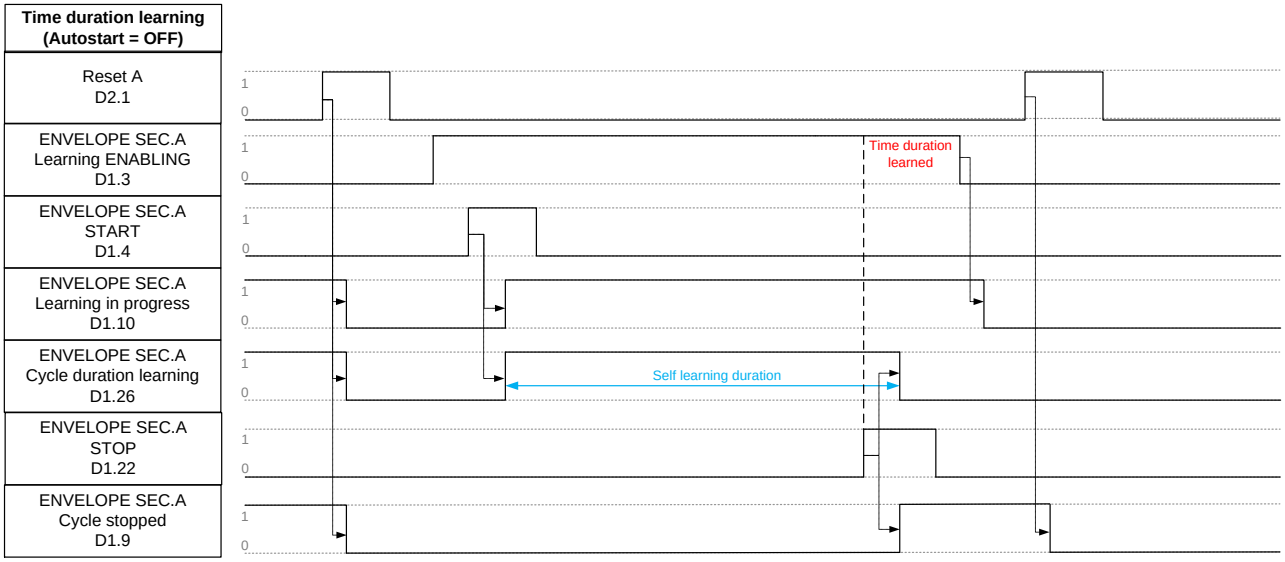


Note:

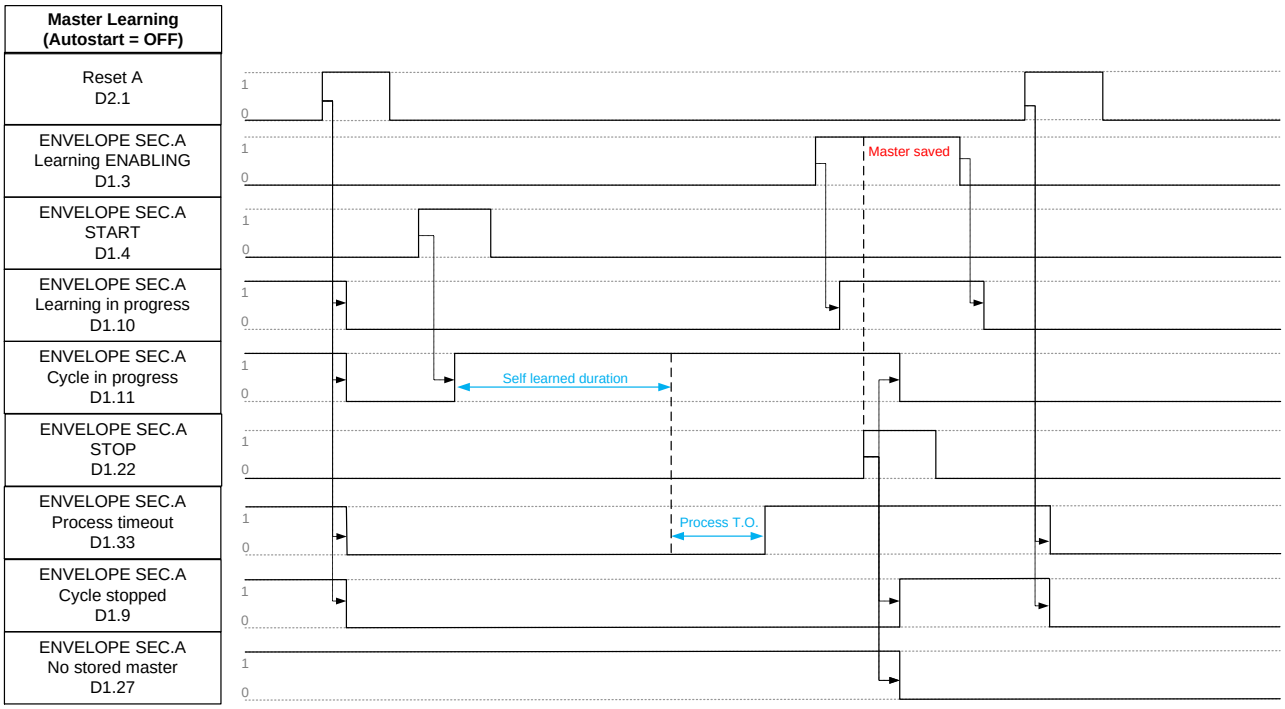
- Process duration is defined by user according with duration of the process to analyze.
- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after process duration plus timeout value both defined on related parameters.

3.1.2.5.3 Master learning (with Self learning duration = ON and Austostart = OFF)

With Self learning duration = ON, process duration specification is not required anymore.
First learning cycle is required just to learn the process duration.



Second learning cycle is required to learn the master shape.



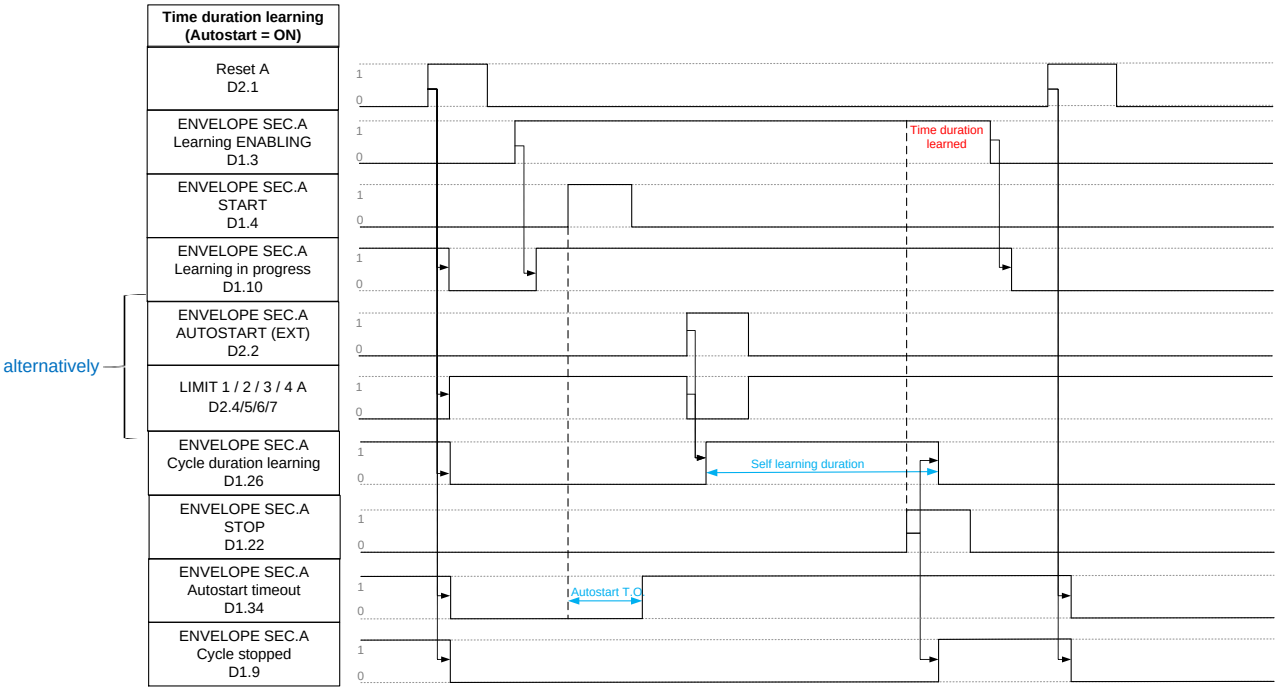
Note:

- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after learned process duration plus timeout value defined on related parameter.

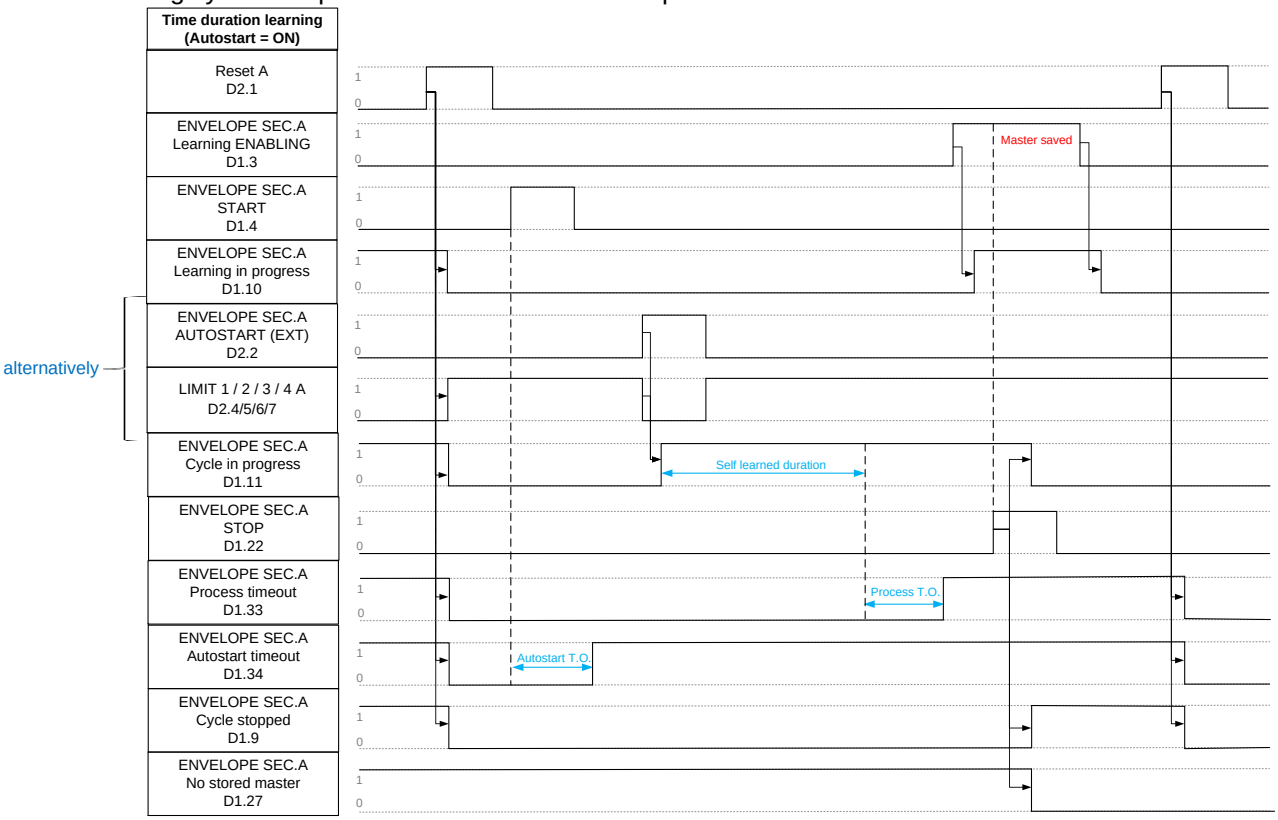
3.1.2.5.4 Master learning (with Self learning duration = ON and Austostart = ON)

With Self learning duration = ON, process duration specification is not required anymore.
First learning cycle is required just to learn the process duration.
The process starts using alternatively:

a. Autostart external signal
b. Limit 1, 2, 3, 4



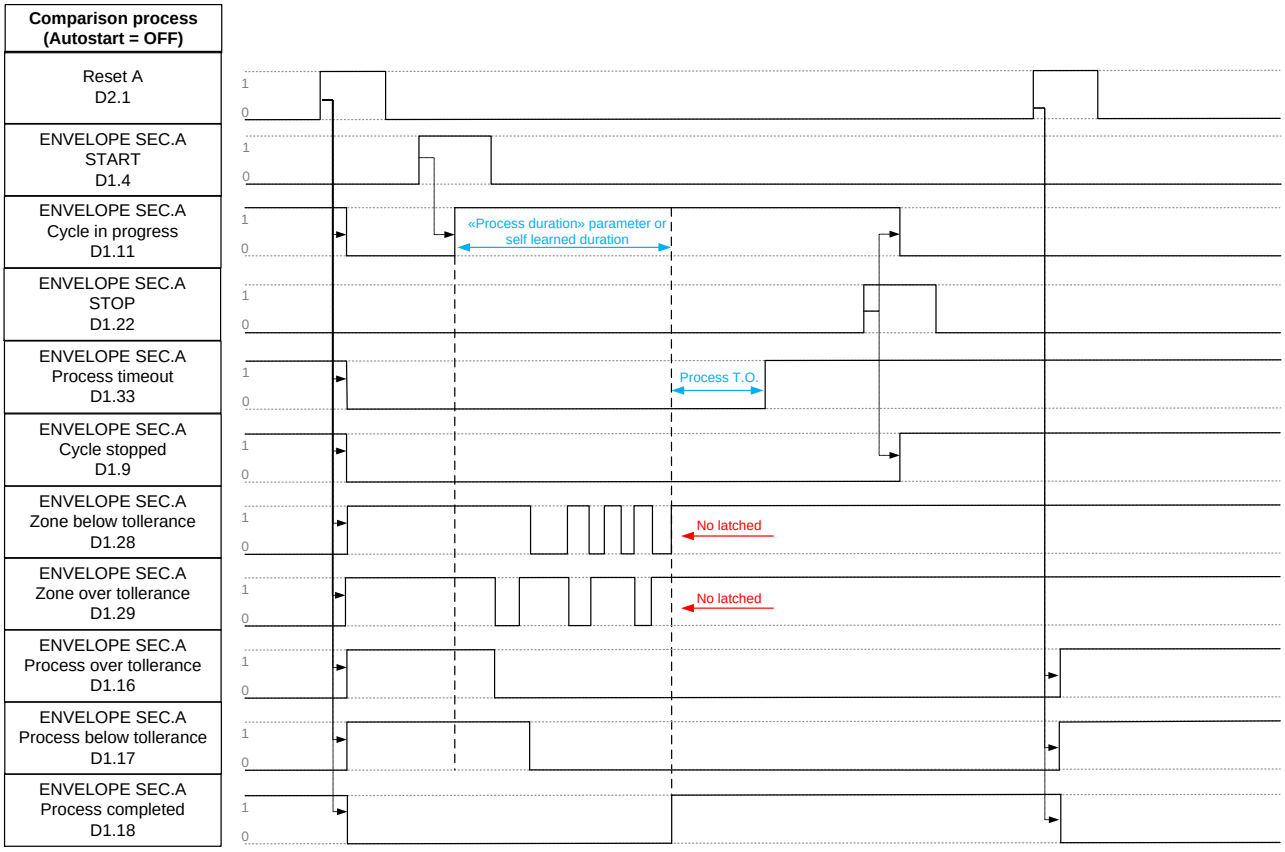
Second learning cycle is required to learn the master shape.



Note:

- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after learned process duration plus timeout value defined on related parameter.

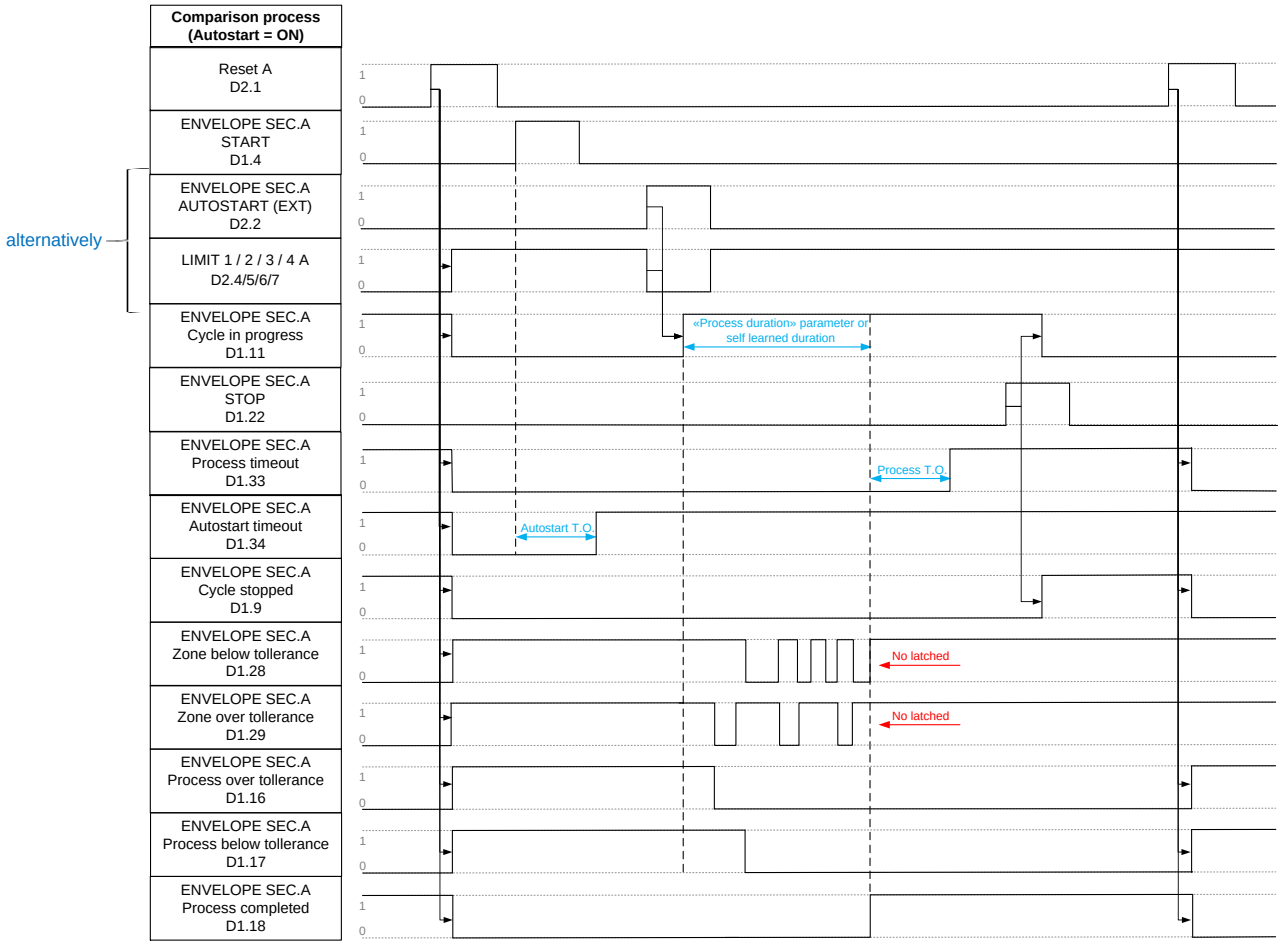
3.1.2.5.5 Comparison process (with Autostart = OFF)



Note:

- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after process duration (learned or defined by related parameter) plus timeout value.

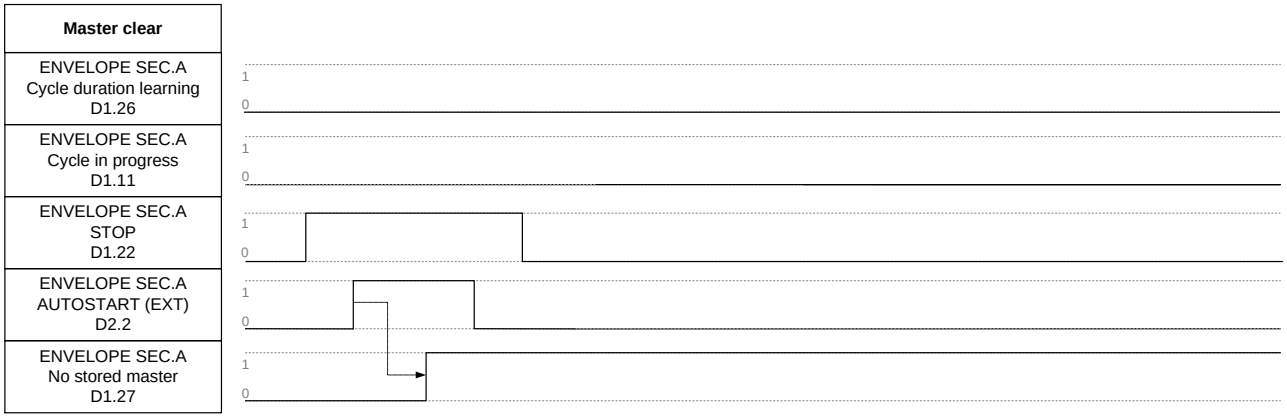
3.1.2.5.6 Comparison process (with Autostart = ON)



Note:

- Process timeout output is activated if stop signal (D1 connector PIN 22) has not been sent after process duration (learned or defined by related parameter) plus timeout value.

3.1.2.5.7 Master clear



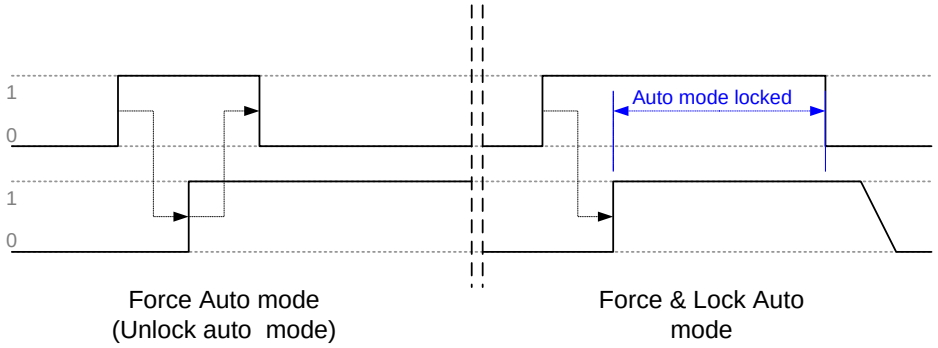
4. Gauge [GA type]

4.1. Signals logic on connector G1

4.1.1. Without handshake (default)

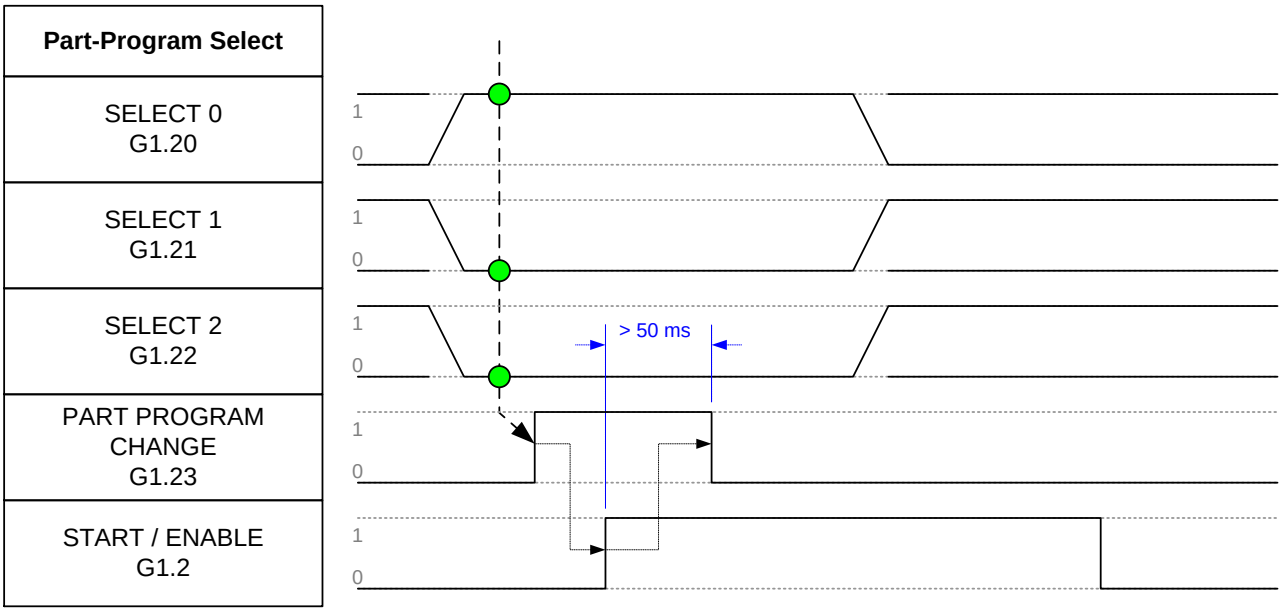
4.1.1.1. Automatic mode

Automatic mode
AUTOMATIC LOCK G1.24
AUTOMATIC MODE G1.14



4.1.1.2. Part-Program change (Select 0, 1, 2) – Example PP2

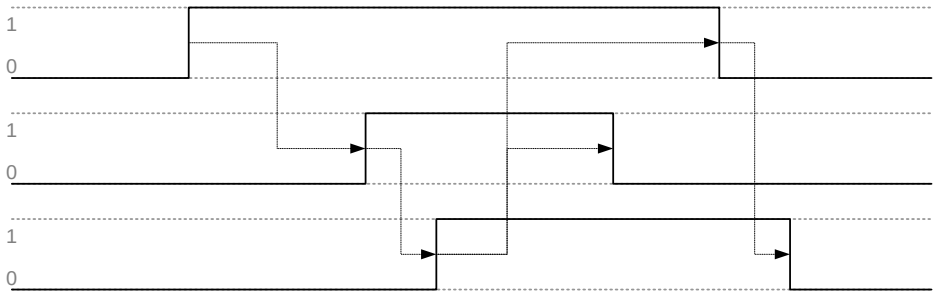
Part-program table			
Selected Part Program	**Select 0**	**Select 1**	**Select 2**
1	0	0	0
2	1	0	0
3	0	1	0
4	1	1	0
5	0	0	1
6	1	0	1
7	0	1	1
8	1	1	1



Set Part-Program 2

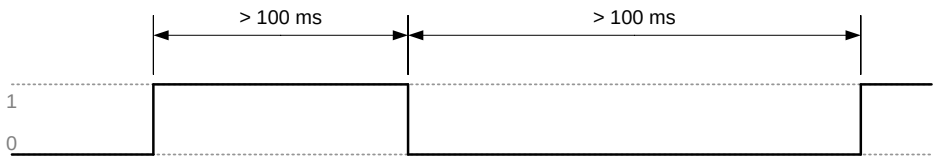
4.1.1.3. Auto-zeroing cycle

Auto-Zeroing Section A
ZERO G1.4
START / ENABLE G1.2
ZERO G1.15



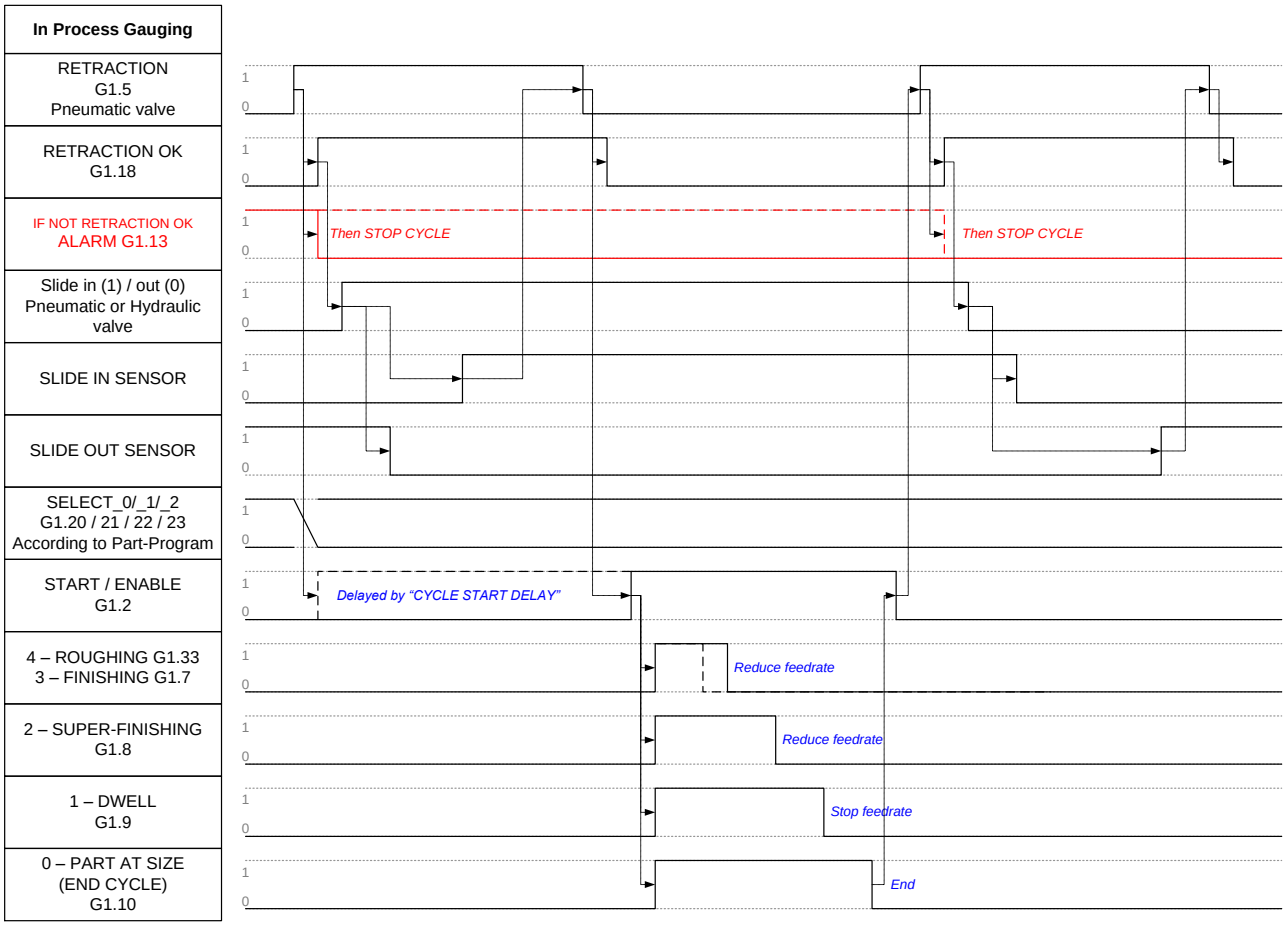
4.1.1.4. Offset correction

Offset correction
OFFSET + (G1.3)* or OFFSET - (G1.6)*

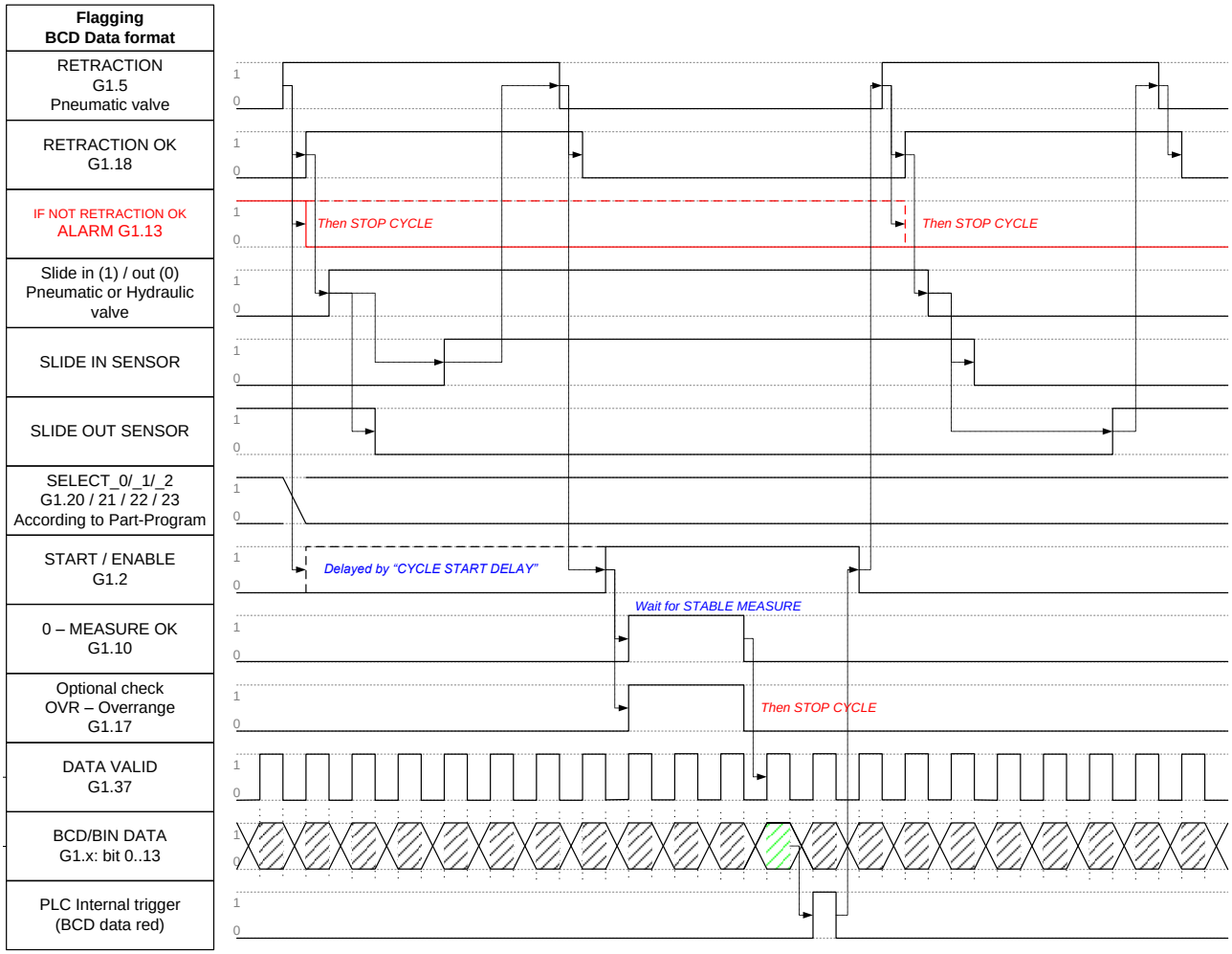


(*) Programmable input

4.1.1.5. In-Process gauging cycle - Example

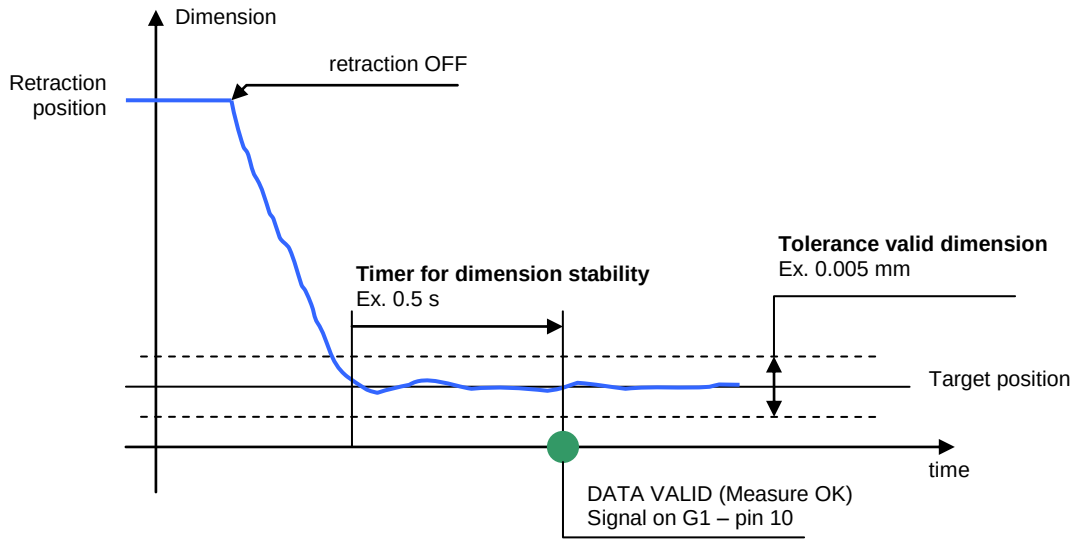


4.1.1.6. Pre-process (Flagging) - Example



(**) WAIT FOR MEASURE STABLE

The following parameters allow the DATA VALID signalling (dimension valid)



Parameter	Description
Timer for dimension stability [s] **[1.0]**	Time required for the establishment of measurement until the dimension may considered valid in the limits programmed by the parameter “TOLERANCE VALID DIMENSION”.
Tolerance valid dimension **[0.0050]**	Maximum deviation (positive or negative) allowed to the measurement until the dimension is considered stable or valid.

For further details on part-program parameters see “9UMEN1505-1200 YYMMDD Parameter Setup v120 En.pdf”

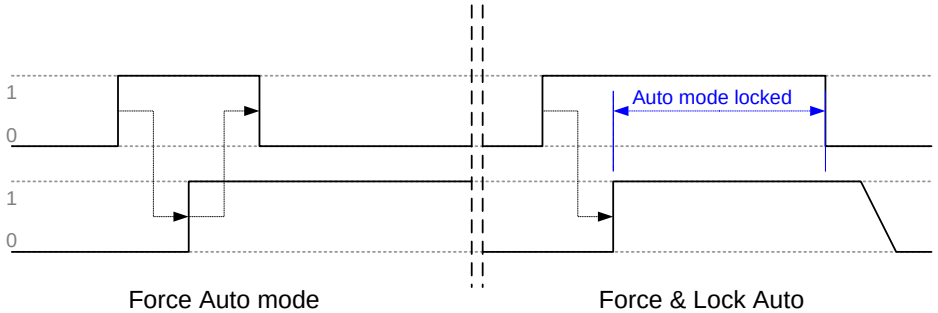
5. Gauge [NG type]

5.1. Signals logic on connector G1

5.1.1. Without handshake (default)

5.1.1.1. Automatic mode

Automatic mode
AUTOMATIC LOCK G1.24
AUTOMATIC MODE G1.14

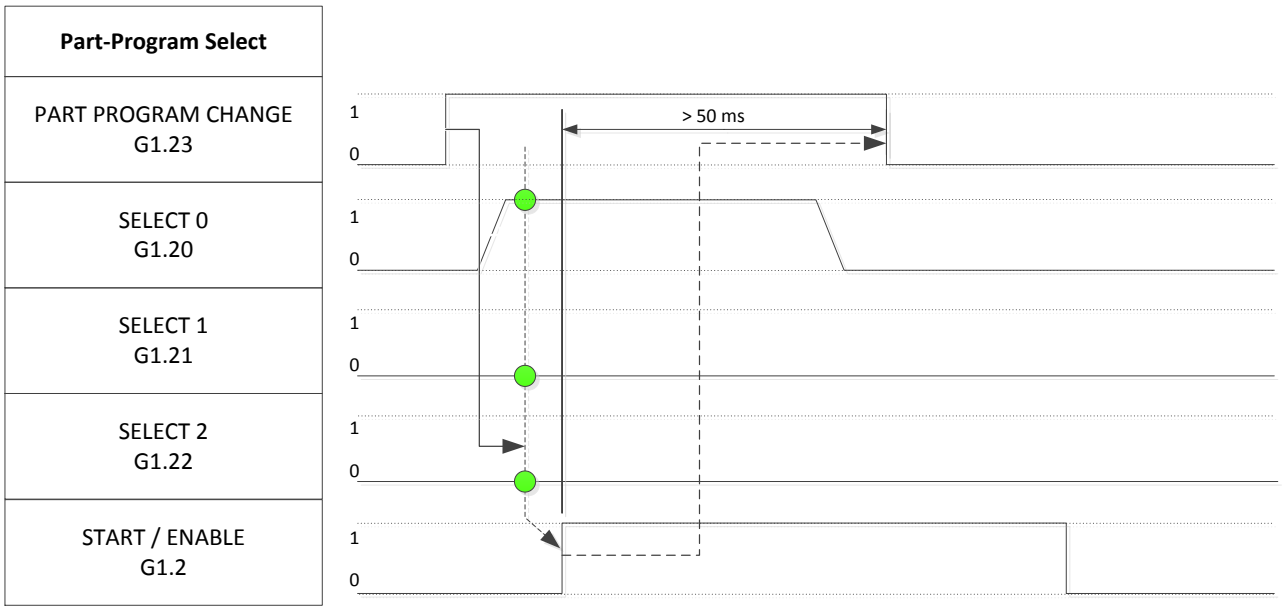


Force Auto mode
(Unlock auto mode)

Force & Lock Auto
mode

5.1.1.2. Part-Program change (Select 0, 1, 2) – Example PP2

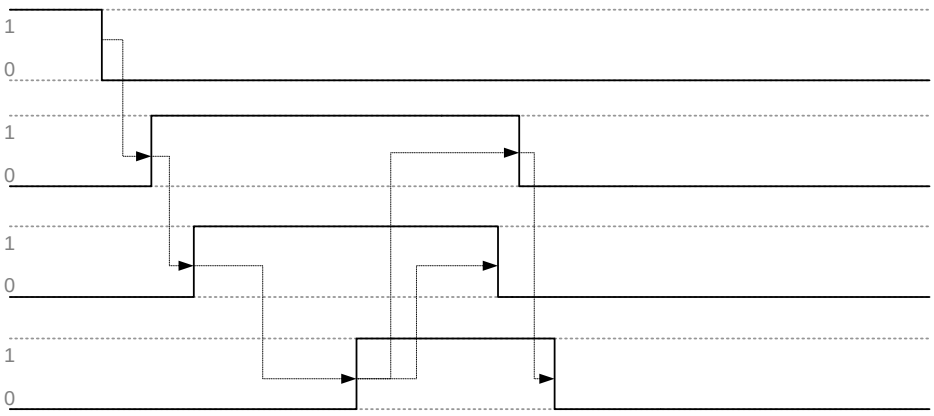
Part-program table			
Selected Part Program	**Select 0**	**Select 1**	**Select 2**
1	0	0	0
2	1	0	0
3	0	1	0
4	1	1	0
5	0	0	1
6	1	0	1
7	0	1	1
8	1	1	1



Set Part – Program 2

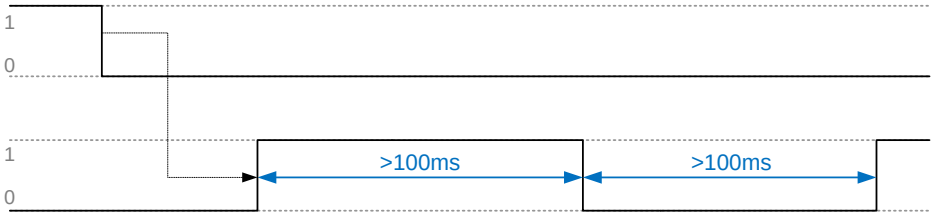
5.1.1.3. Auto-zeroing cycle

Auto-Zeroing Section A
PART PROGRAM CHANGE G1.23
ZERO G1.4
START G1.2
ZERO G1.15

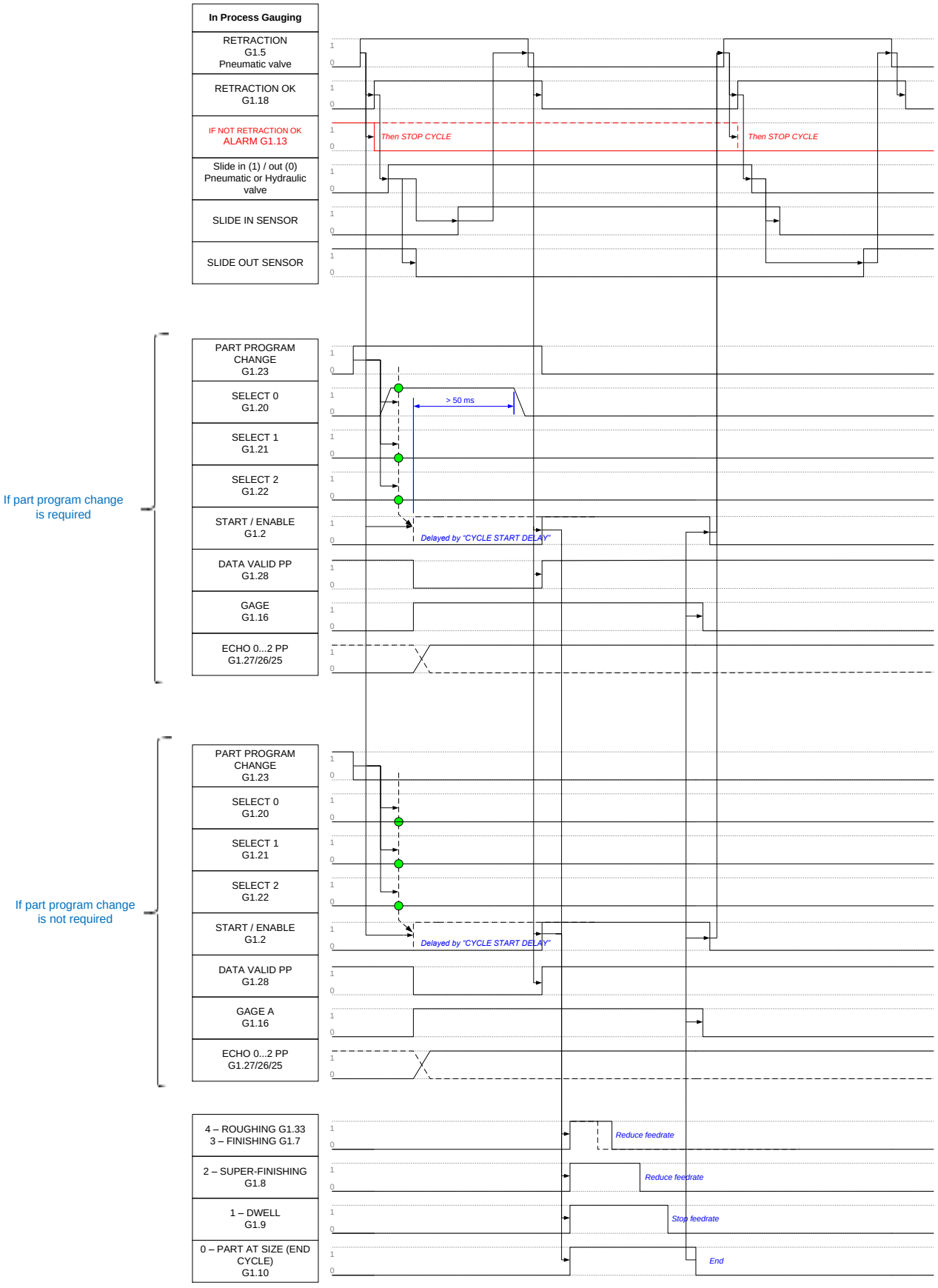


5.1.1.4. Offset correction

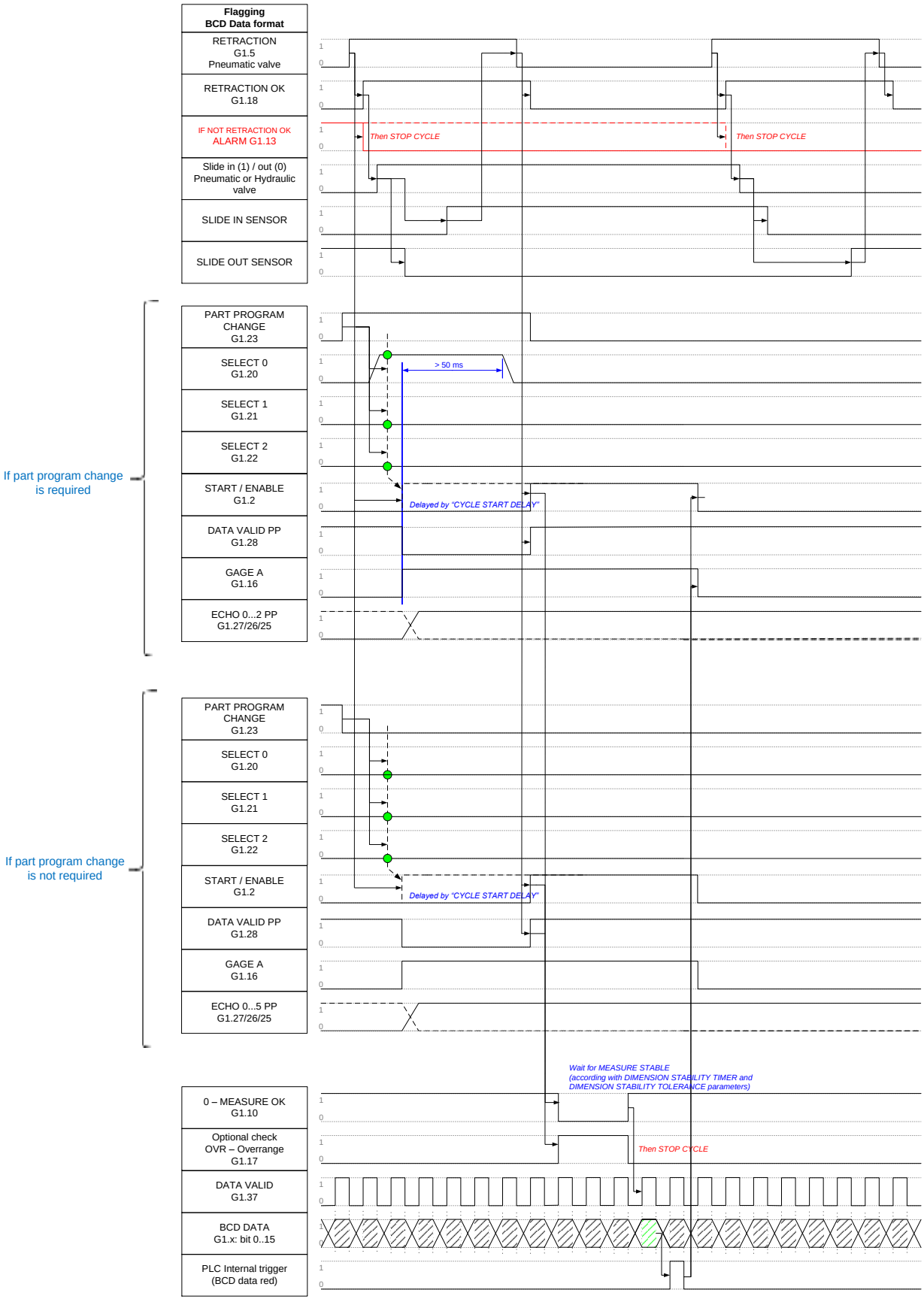
Offset correction
PART PROGRAM CHANGE G1.23
OFFSET + (G1.21) Or OFFSET – (G1.6) Or OFFSET RESET (G1.22)



5.1.1.5. In-Process gauging cycle - Example

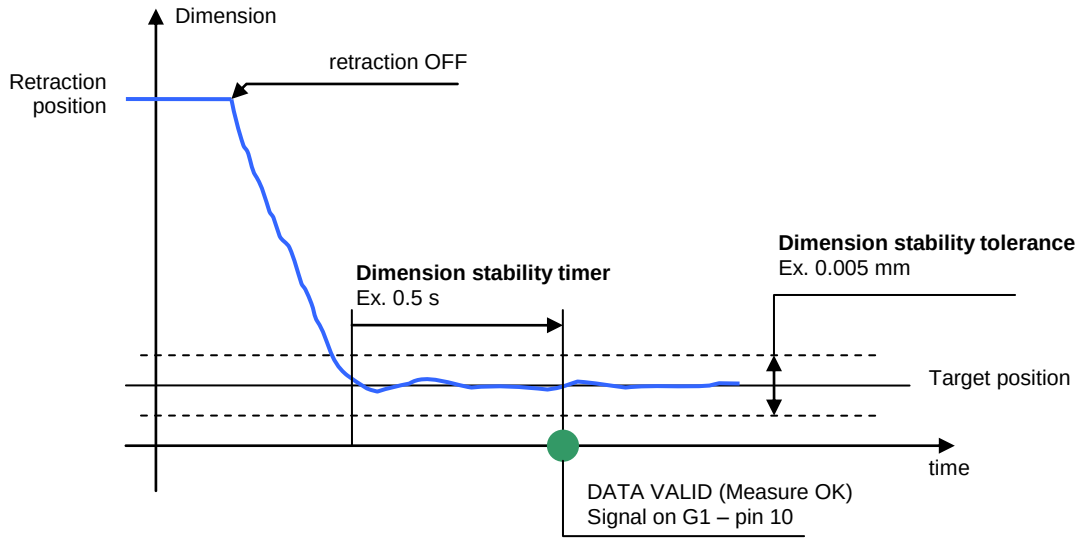


5.1.1.6. Pre-process (Flagging) - Example



(**) WAIT FOR MEASURE STABLE

The following parameters allow the DATA VALID signalling (dimension valid)



Parameter	Description
Dimension stability timer [s] **[1.0]**	Time required for the establishment of measurement until the dimension may considered valid in the limits programmed by the parameter “DIMENSION STABILITY TOLERANCE”.
Dimension stability tolerance [mm] **[0.005]**	Maximum deviation (positive or negative) allowed to the measurement until the dimension is considered stable or valid.
Dimension stability timeout [s] **[1.5]**	Max time allowed to reach the dimension stability

For further details on part-program parameters see “9UMEN1505-1200 YYMMDD Parameter Setup v120 En.pdf”