VM15

Profibus-Profinet signals interface

Installer manual
VM15 – Profibus-Profinet signals interface

9UMEN1509-1200
Release: 210707

VM15 Profibus-Profinet signals interface

1. System

1.1. Introduction

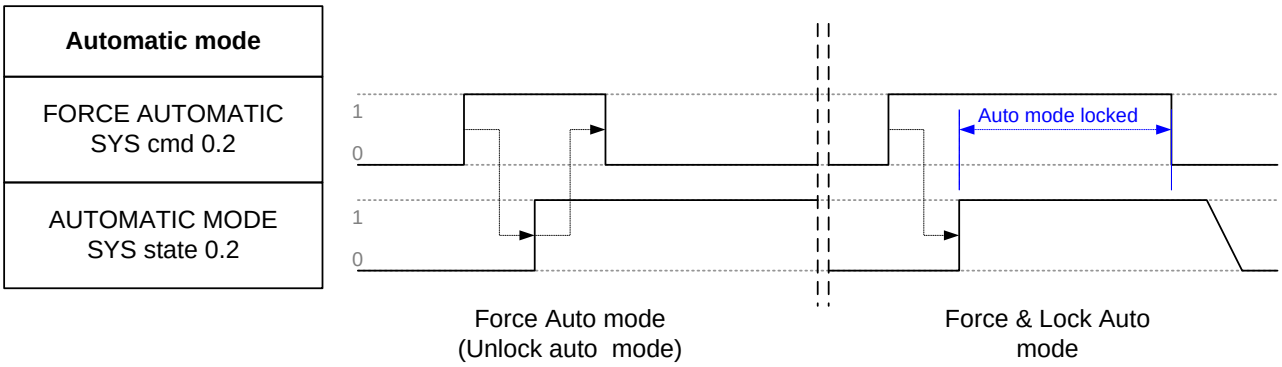
The control of the preliminary conditions is performed by the system and depends on the parameters setup. Some of these conditions are associated with digital signals on connectors / Profibus DP / ProfiNET.

For details about the commands and status signals on Profibus DP / ProfiNET refer to the document 9UMEN1503-1200 yymmdd VM15 Profibus-Profinet on MN card.

For details about Multinet parameter setup refer to the document 9UMEN1508-1200 yymmdd VM15 Multinet Parameter.

1.2. Signals logic on Profibus DP / ProfiNET

1.2.1. Automatic mode



2. 1 plane Balancer [BN type]

2.1. Signals logic on Profibus DP / ProfiNET

Following sections are arranged as follow:

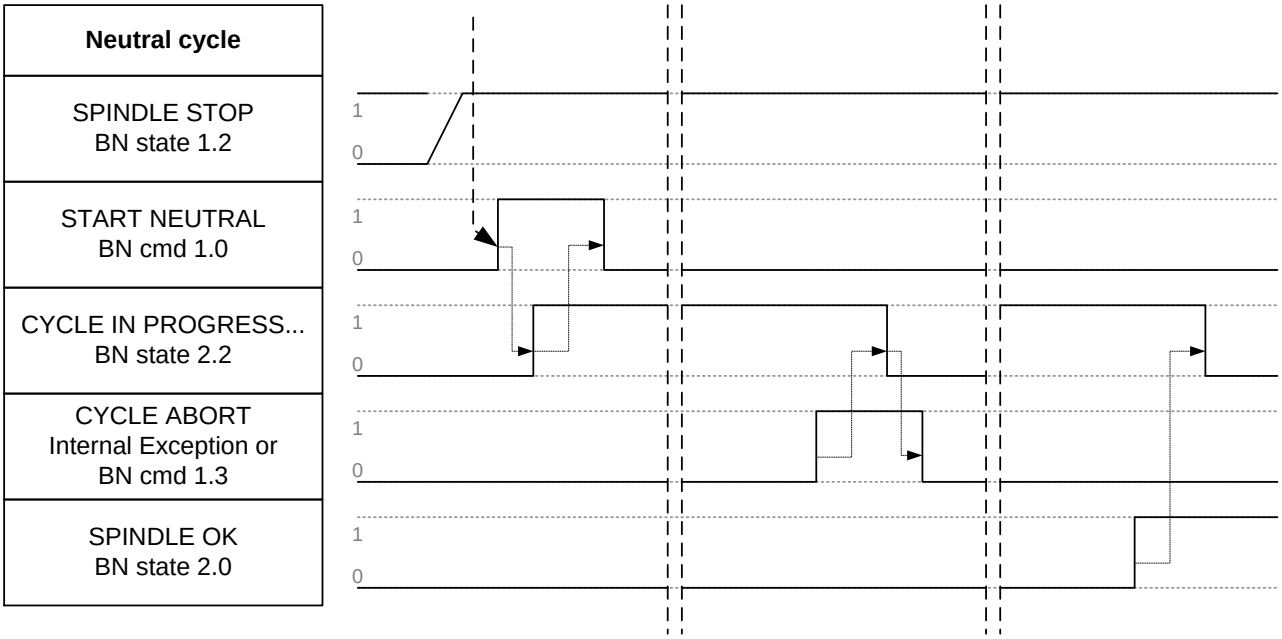
- *Without handshake*: disabling the handshake management parameter (SETUP → INPUT OUTPUT → Handshake management = OFF), commands sent to the system, do not produce output signals as a reply. Waiting time is required to correctly process the command.
  This configuration is available for compatibility 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.

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

2.1.1.1. Automatic mode

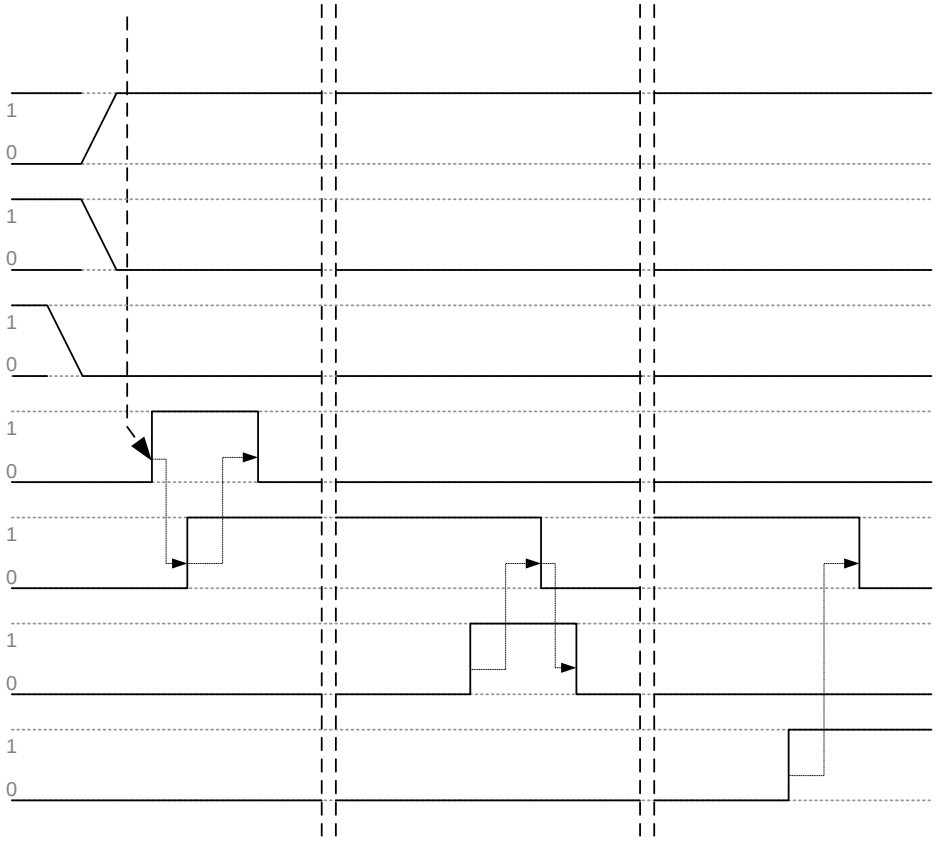
See paragraph 1.

2.1.1.2. Neutral cycle



2.1.1.3. Automatic balancing cycle

Balancing cycle
NOMINAL RPM BN state 1.0
RPM OK BN state 1.1
SPINDLE STOP BN state 1.2
START BALANCING BN cmd 1.1
CYCLE IN PROGRESS... BN state 2.2
CYCLE ABORT Internal Exception or BN cmd 1.3
SPINDLE OK BN state 2.0

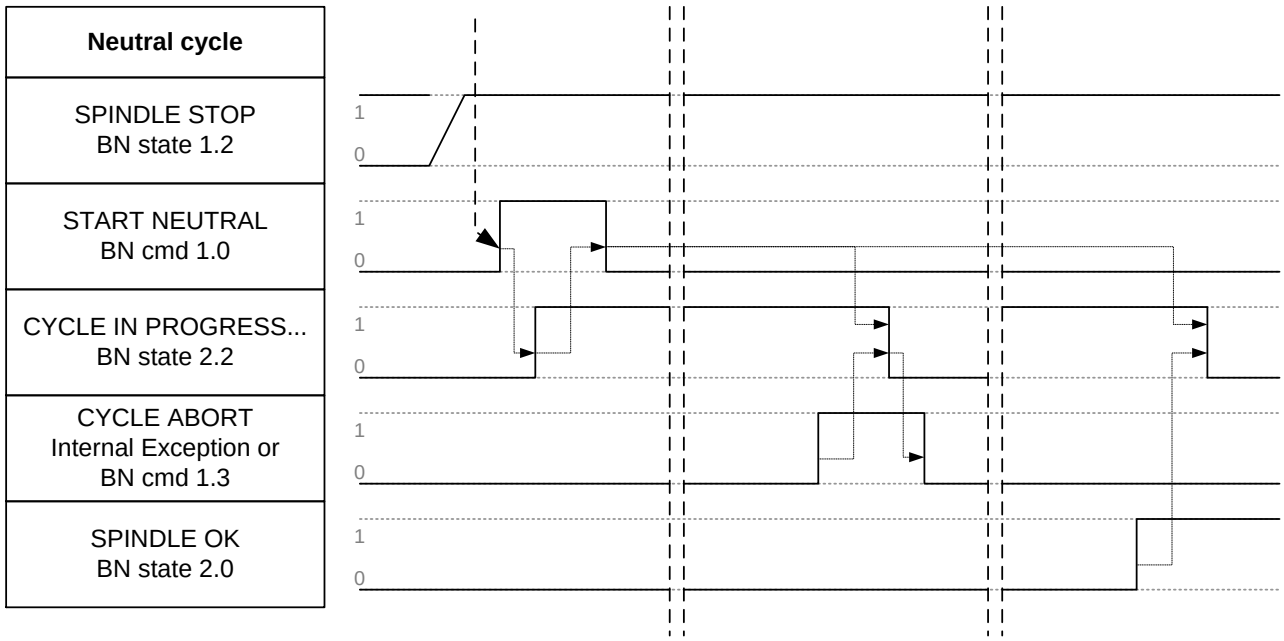


2.1.2. With handshake - (strongly recommended)

2.1.2.1. Automatic mode

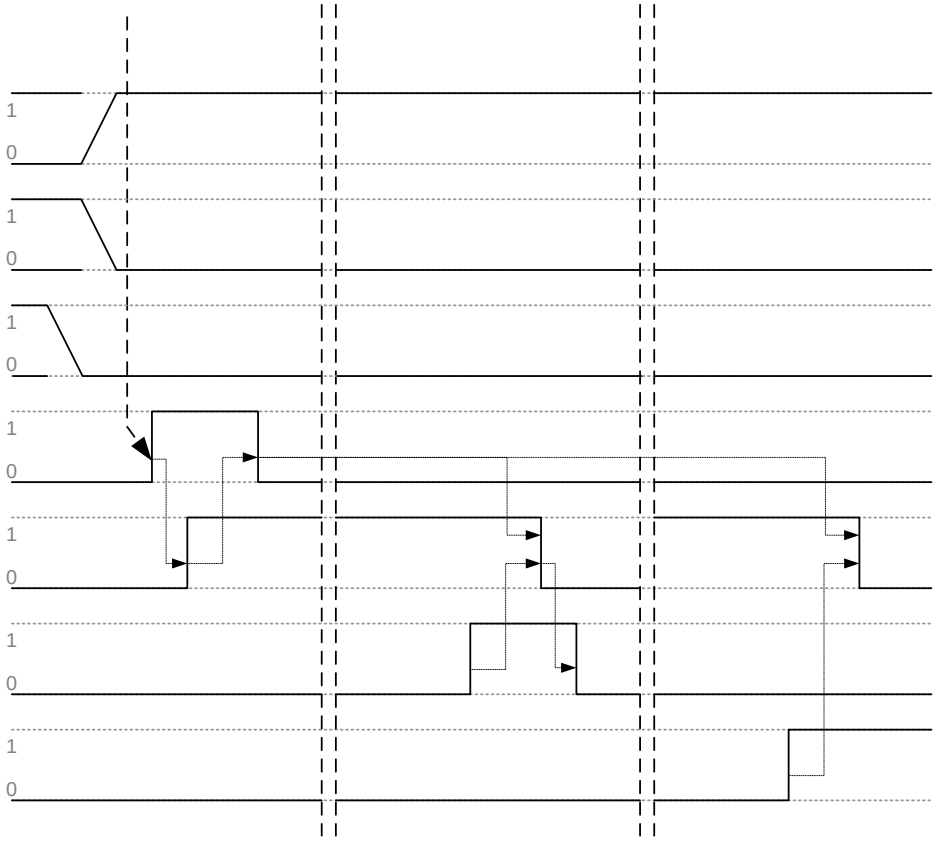
See paragraph 1.

2.1.2.2. Neutral cycle



2.1.2.3. Automatic balancing cycle

Balancing cycle
NOMINAL RPM BN state 1.0
RPM OK BN state 1.1
SPINDLE STOP BN state 1.2
START BALANCING BN cmd 1.1
CYCLE IN PROGRESS... BN state 2.2
CYCLE ABORT Internal Exception or BN cmd 1.3
SPINDLE OK BN state 2.0



3. Touch Detector [TD type]

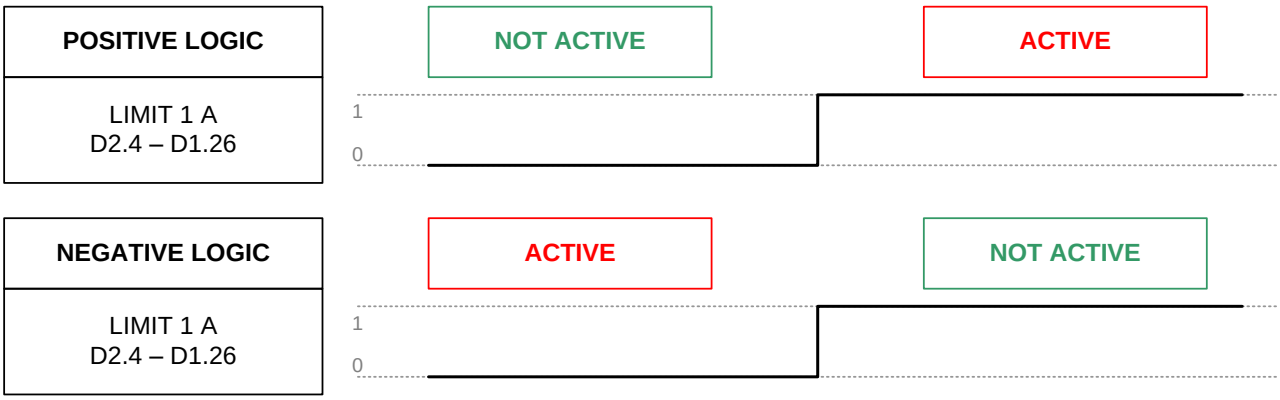
3.1. Signals logic on D2 connector

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.

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

3.1.1.1. Limit 1, 2, 3 and 4 signalling



3.2. Signals logic on Profibus DP / ProfiNET

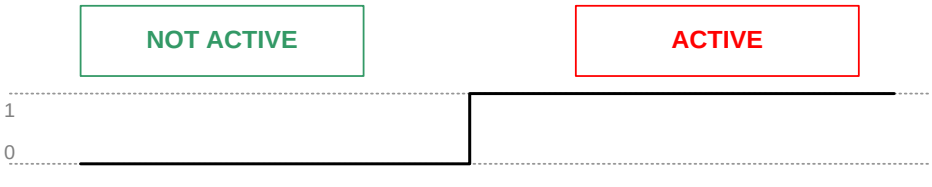
3.2.1. Without handshake - (for compatibility with previous interfaces - default)

3.2.1.1. Automatic mode

See paragraph 1.

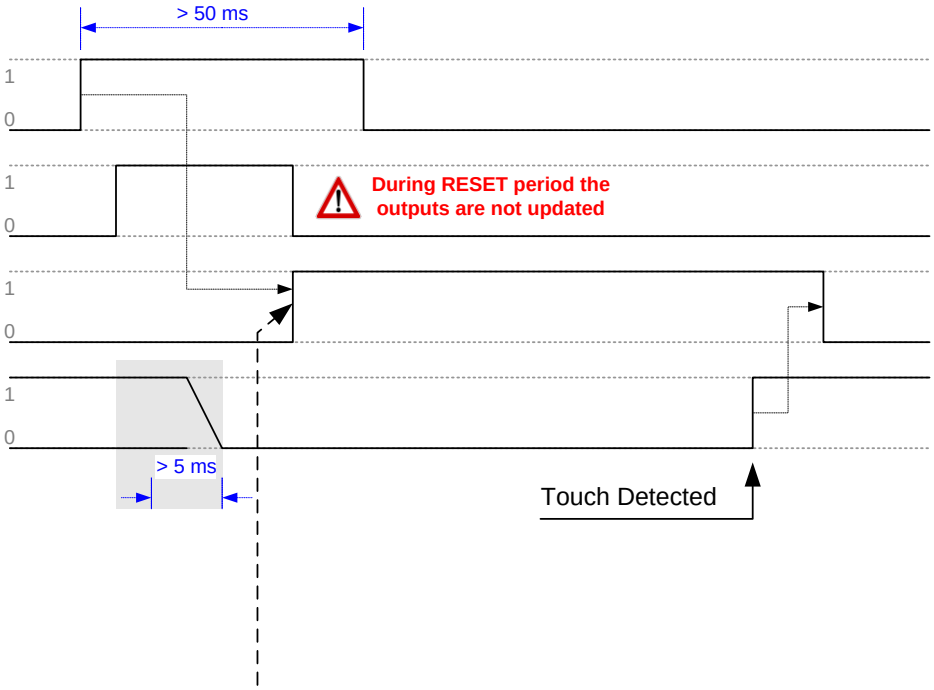
3.2.1.2. Limit 1, 2, 3 and 4 signalling

POSITIVE LOGIC
LIMITS 1, 2, 3, 4

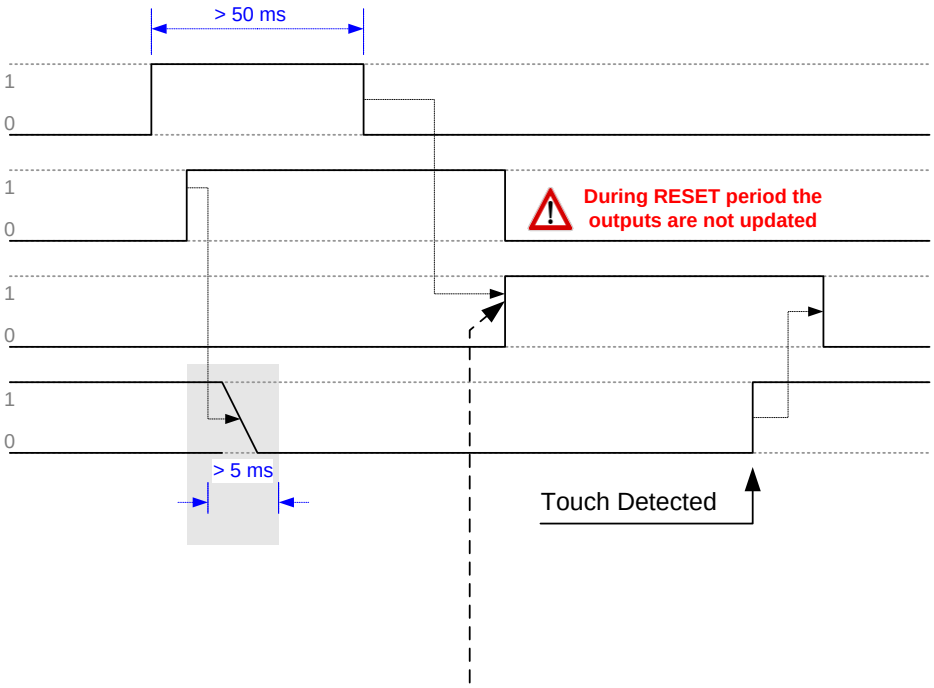


3.2.1.3. Reset

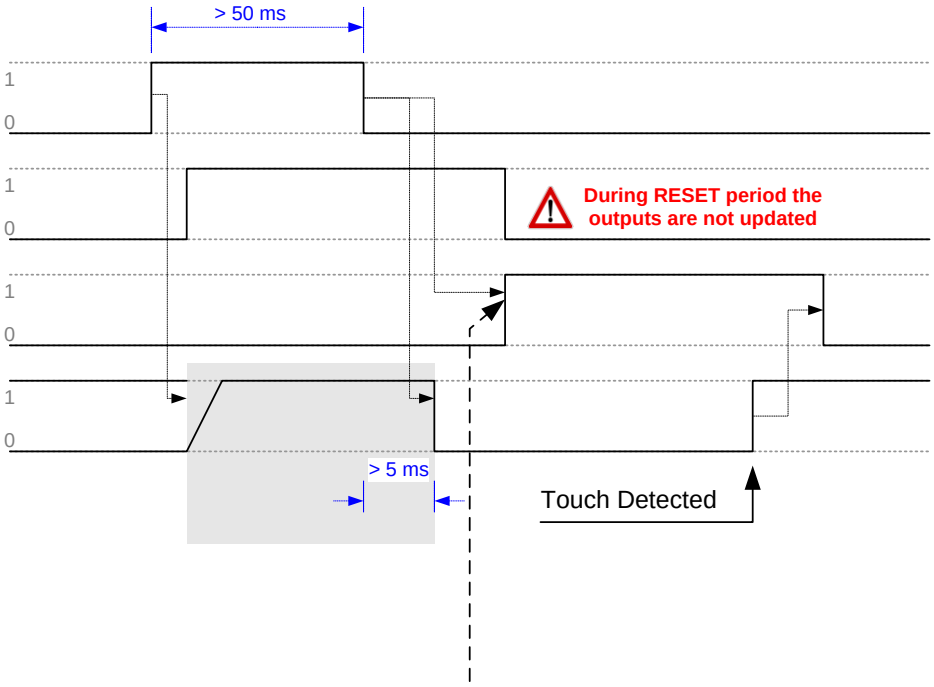
Case 1 RESET = EDGE
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3



Case 2 RESET = STATUS
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3

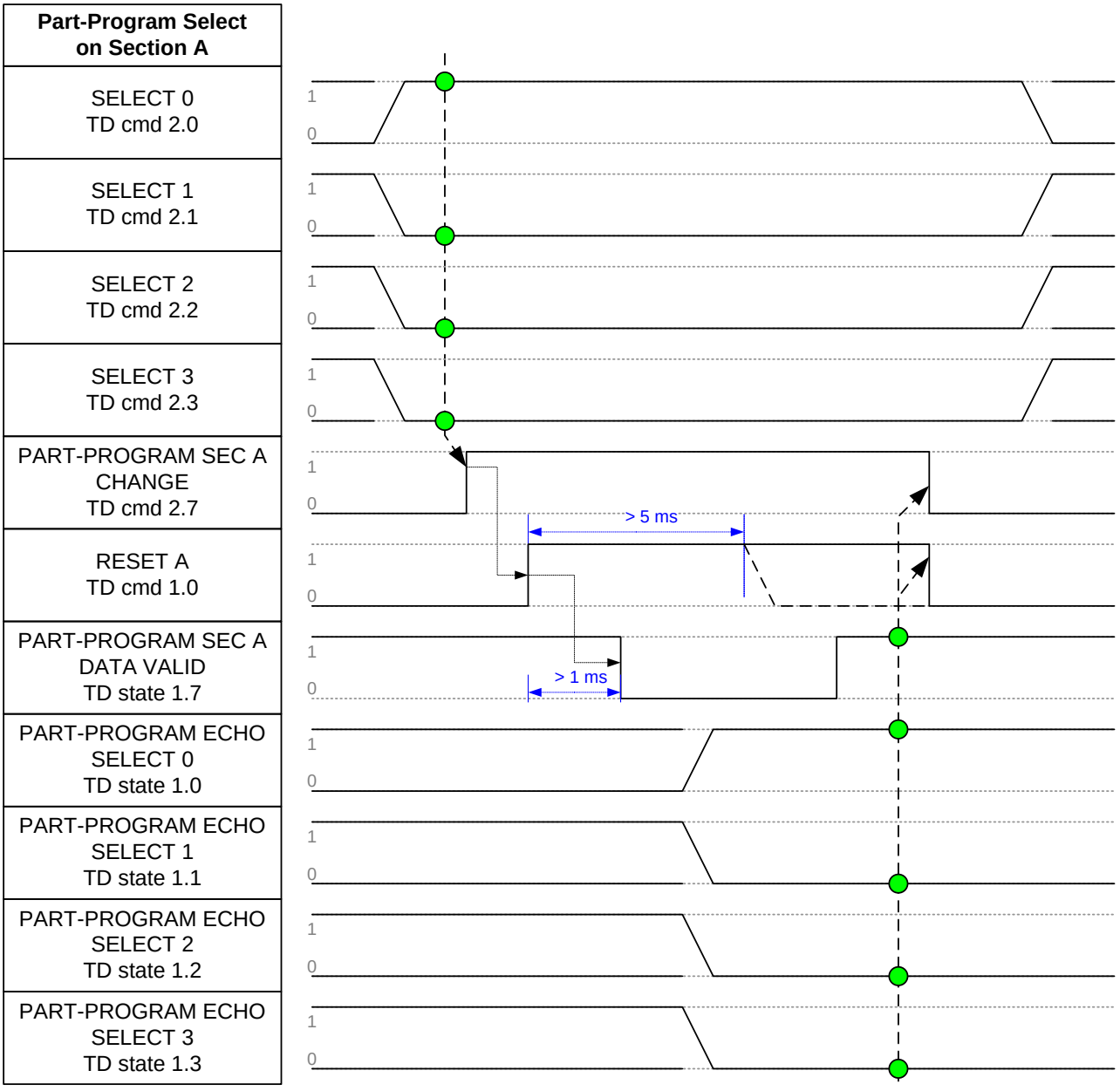


Case 3 RESET = STATUS+TEST
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3



3.2.1.4. Part-Program change (Select 0, 1, 2, 3) – Example PP1 > PP2

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



Set Part-Program 2 on Section A

3.2.1.5. Envelope (Diagnostic cyclic details)

See section 3.2.2.5

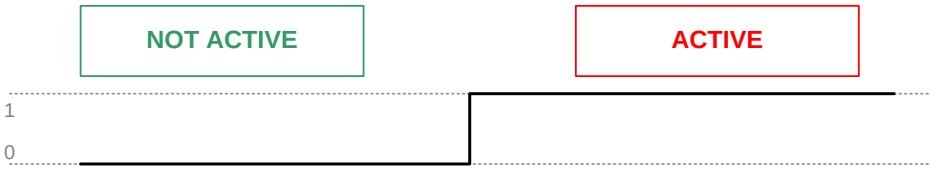
3.2.2. With handshake – (strongly recommended)

3.2.2.1. Automatic mode

See paragraph 1.

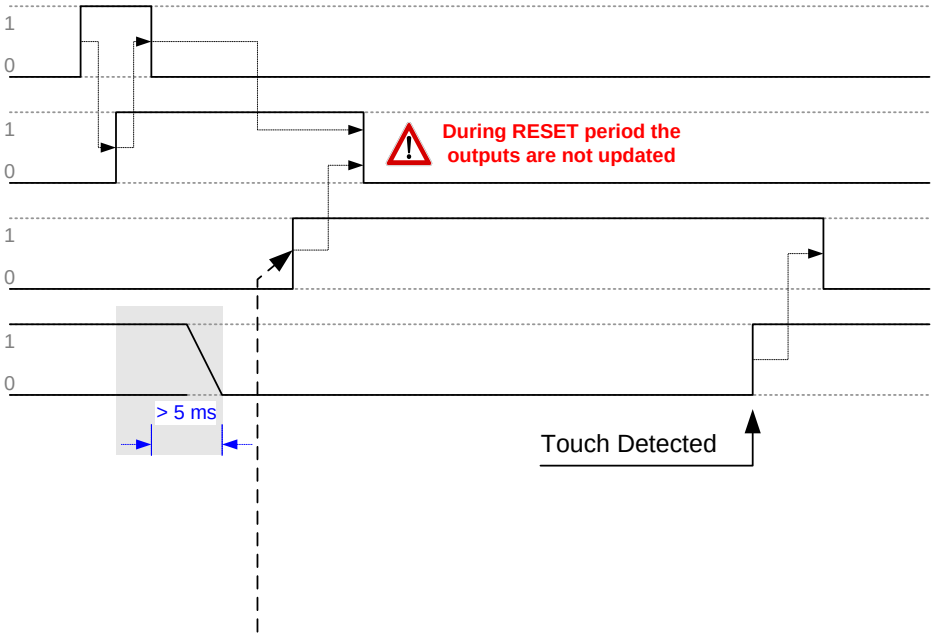
3.2.2.2. Limit 1, 2, 3 and 4 signalling

POSITIVE LOGIC
LIMITS 1, 2, 3, 4

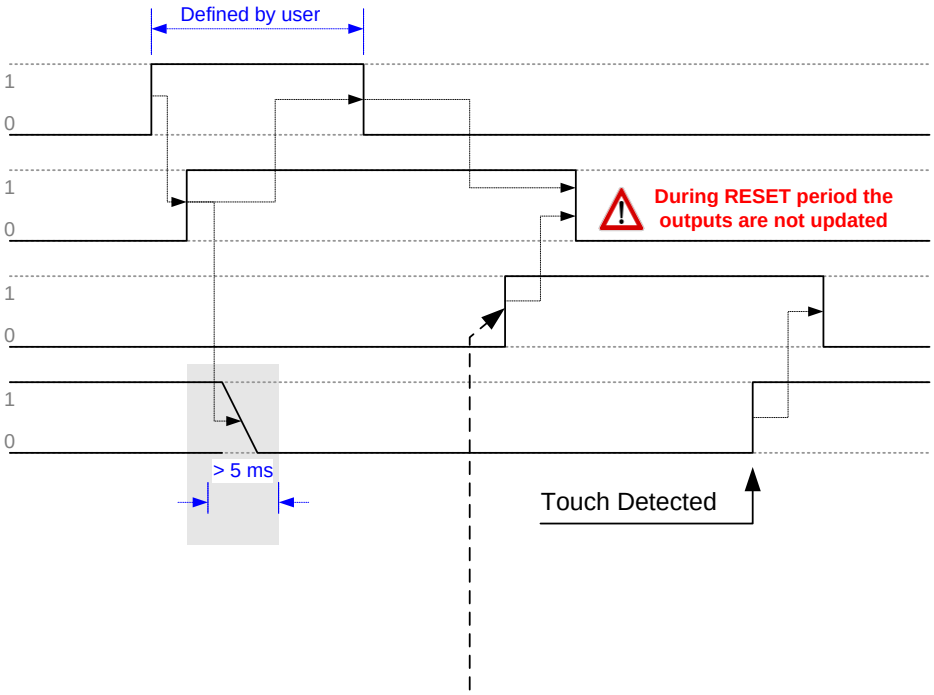


3.2.2.3. Reset

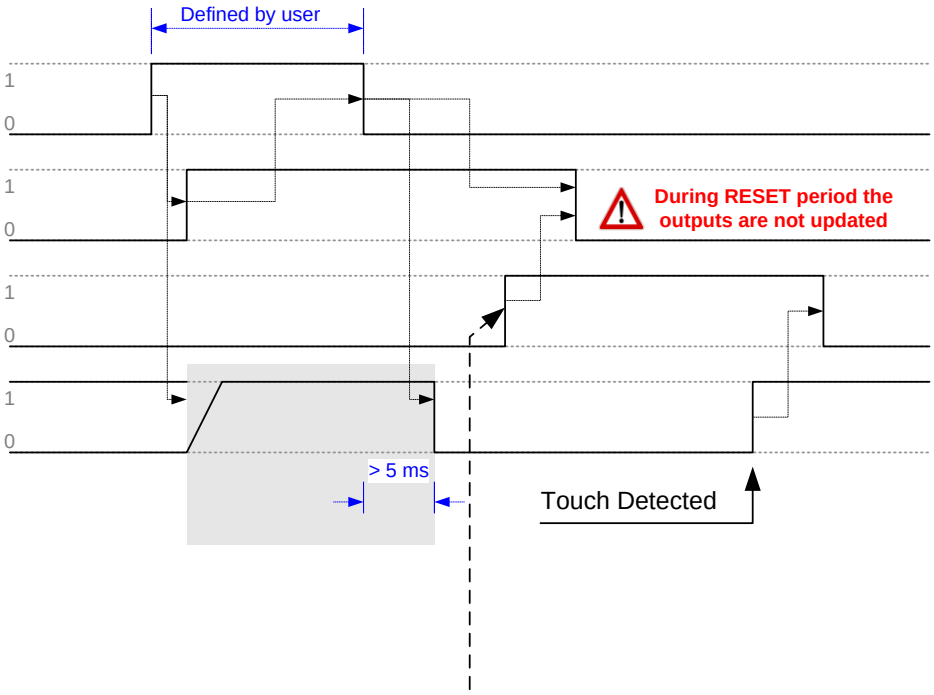
Case 1 RESET = EDGE
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3



Case 2 RESET = STATUS
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3

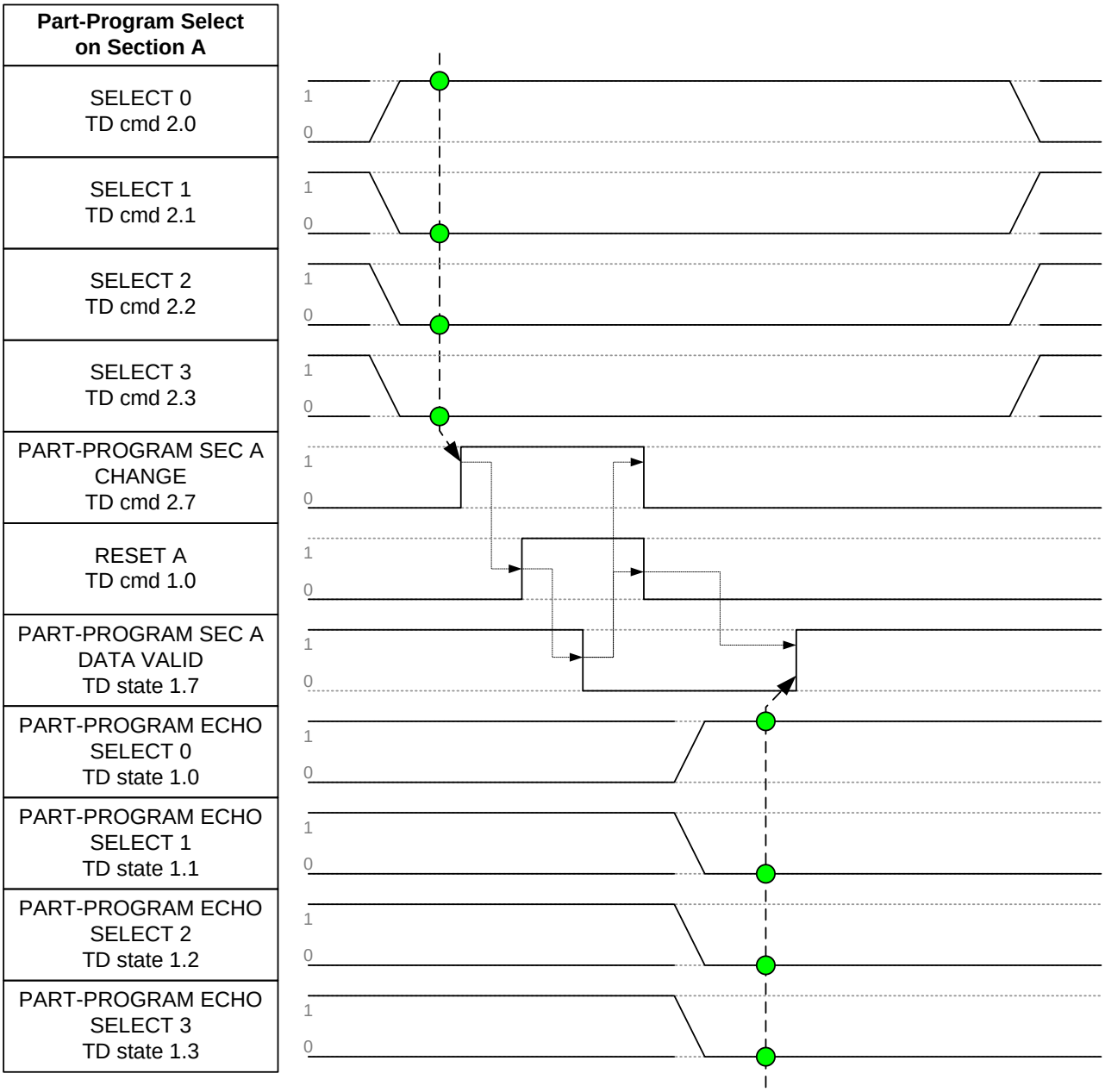


Case 3 RESET = STATUS+TEST
RESET A TD cmd 1.0
RESET IN PROGRESS... A TD state 2.6
CYCLE IN PROGRESS... A TD state 2.7
LIMIT 1 A TD state 2.0
LIMIT 2 A TD state 2.1
LIMIT 3 A TD state 2.2
LIMIT 4 A TD state 2.3



3.2.2.4. Part-Program change (Select 0, 1, 2, 3) – Example PP1 > PP2

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

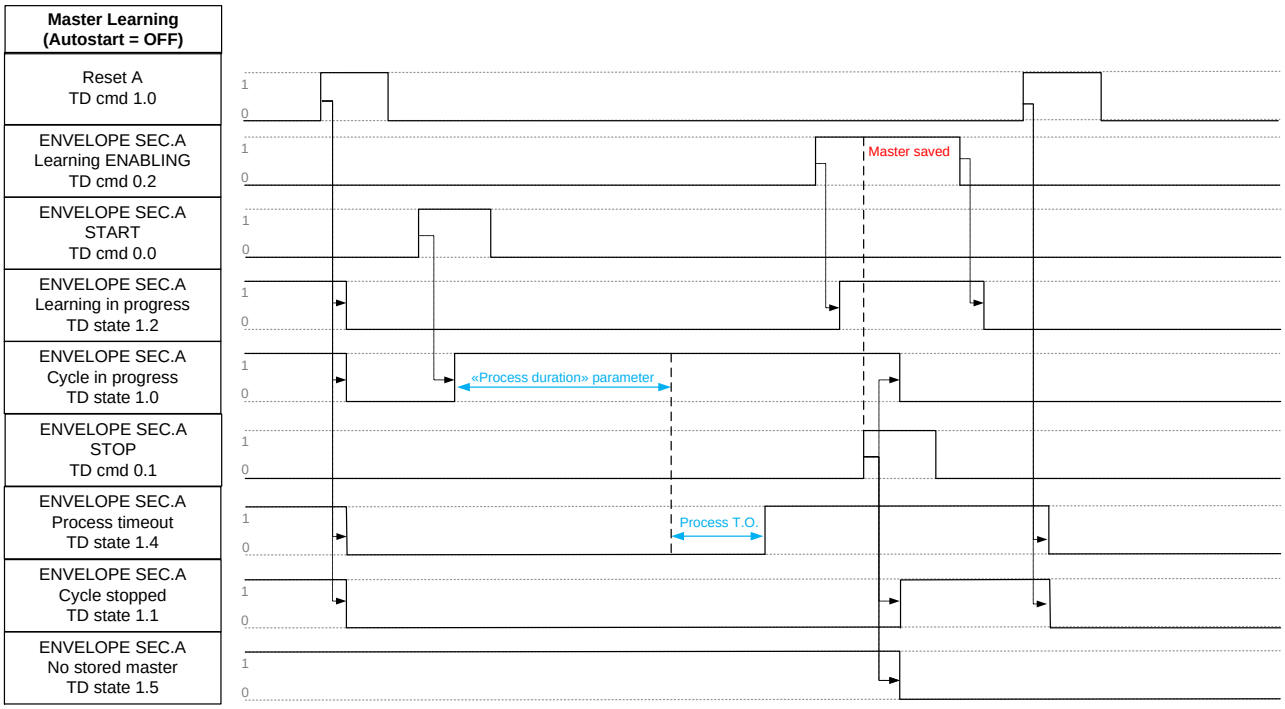


Set Part-Program 2 on Section A

3.2.2.5. Envelope (Diagnostic cyclic details)

3.2.2.5.1 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).



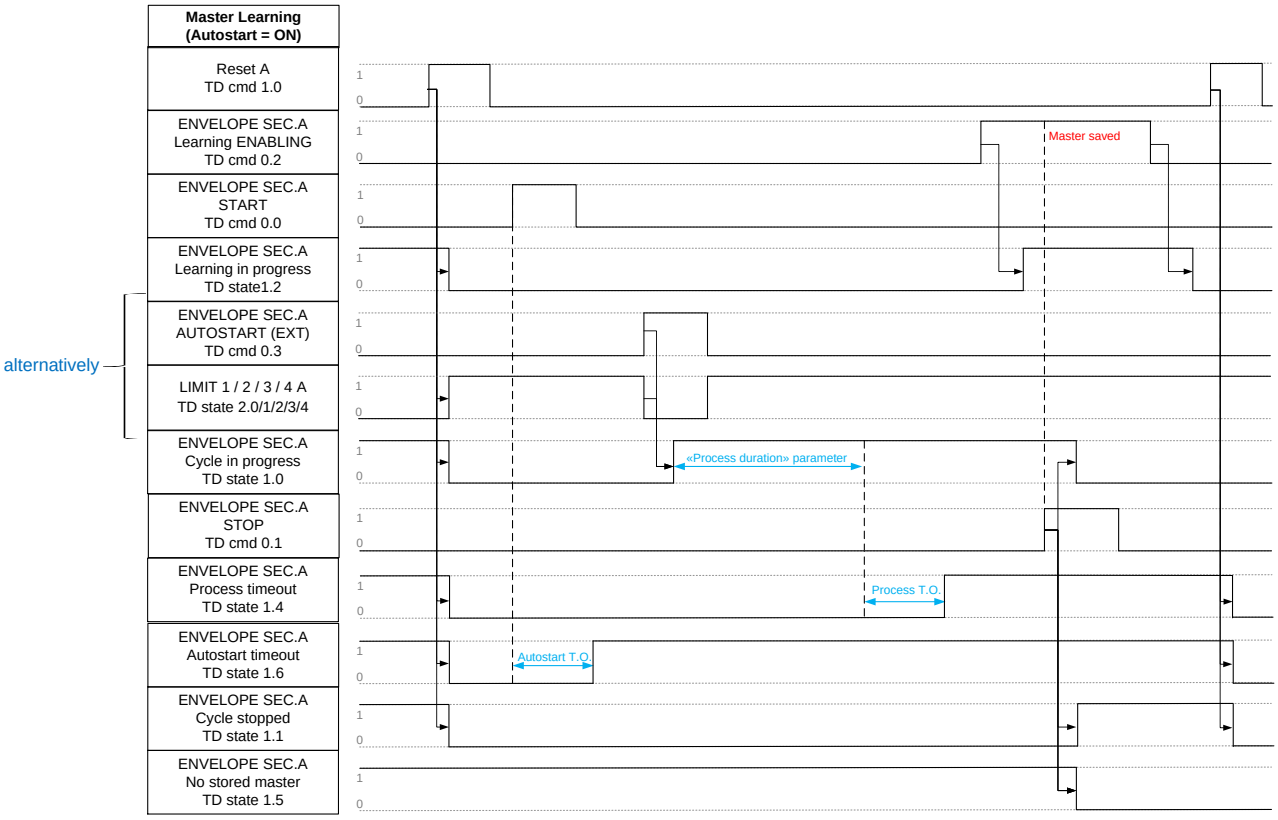
Note:

- Process duration is defined by user according with duration of the process to analyze.
- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after process duration plus timeout value both defined on related parameters.

3.2.2.5.2 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

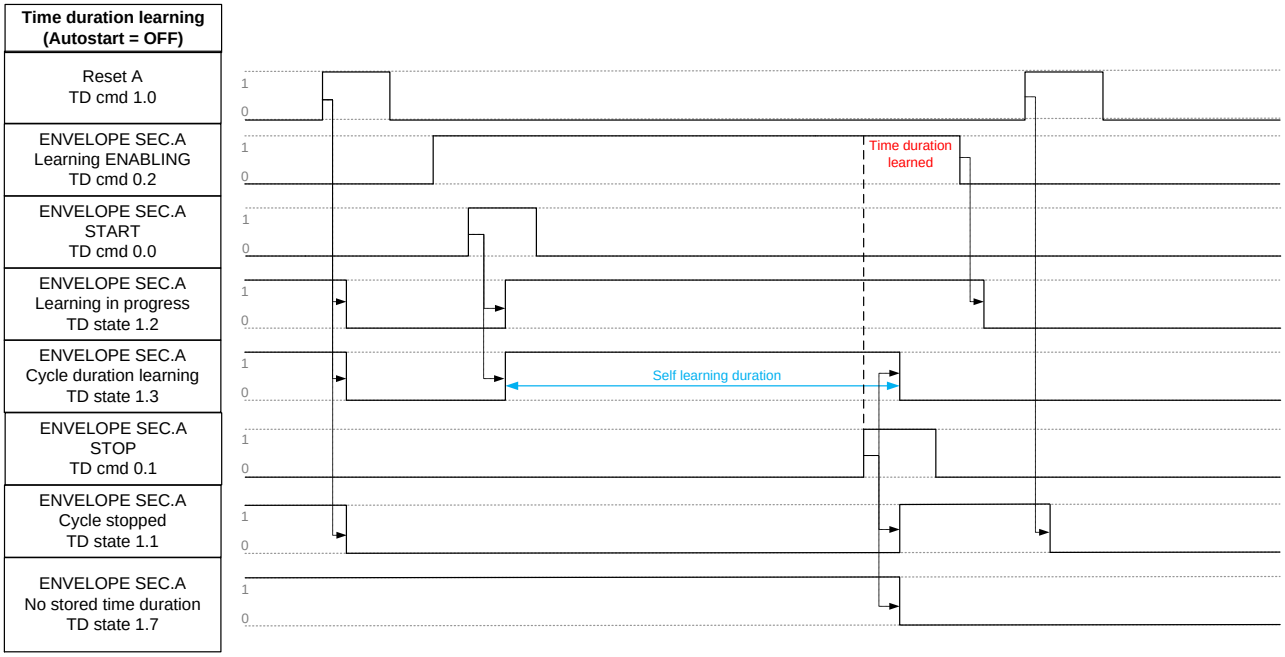


Note:

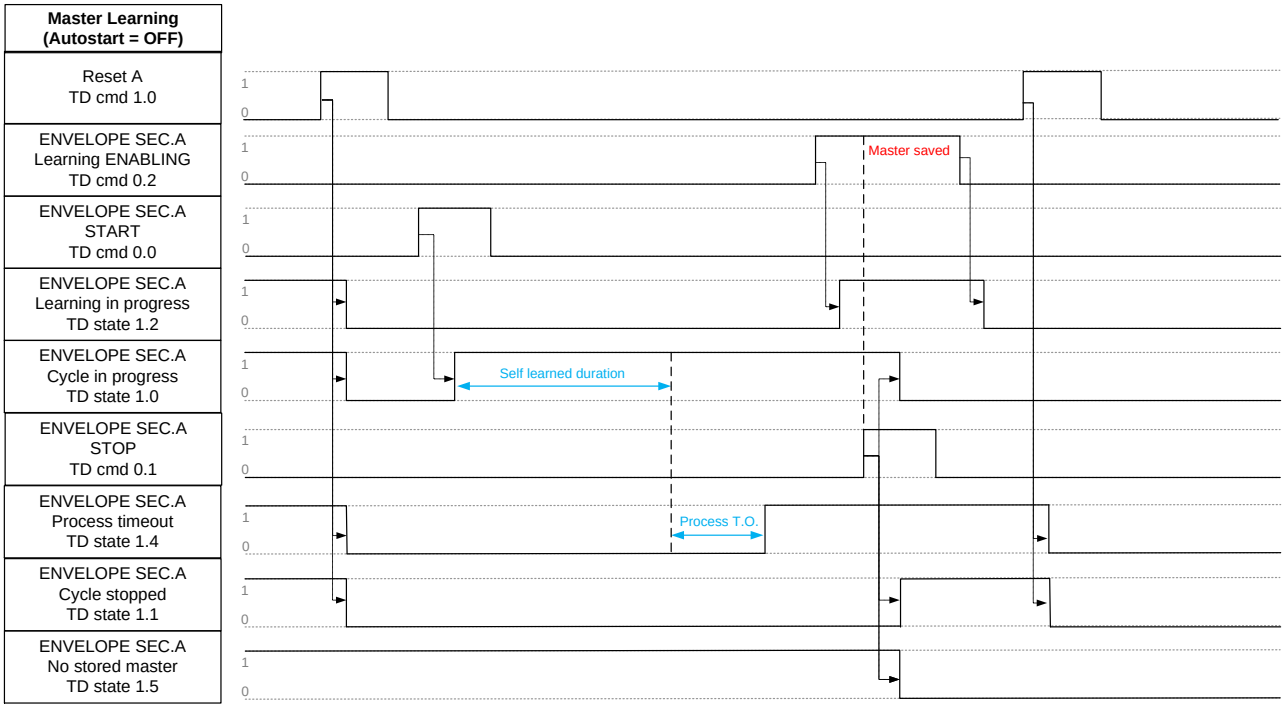
- Process duration is defined by user according with duration of the process to analyze.
- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after process duration plus timeout value both defined on related parameters.

3.2.2.5.3 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.



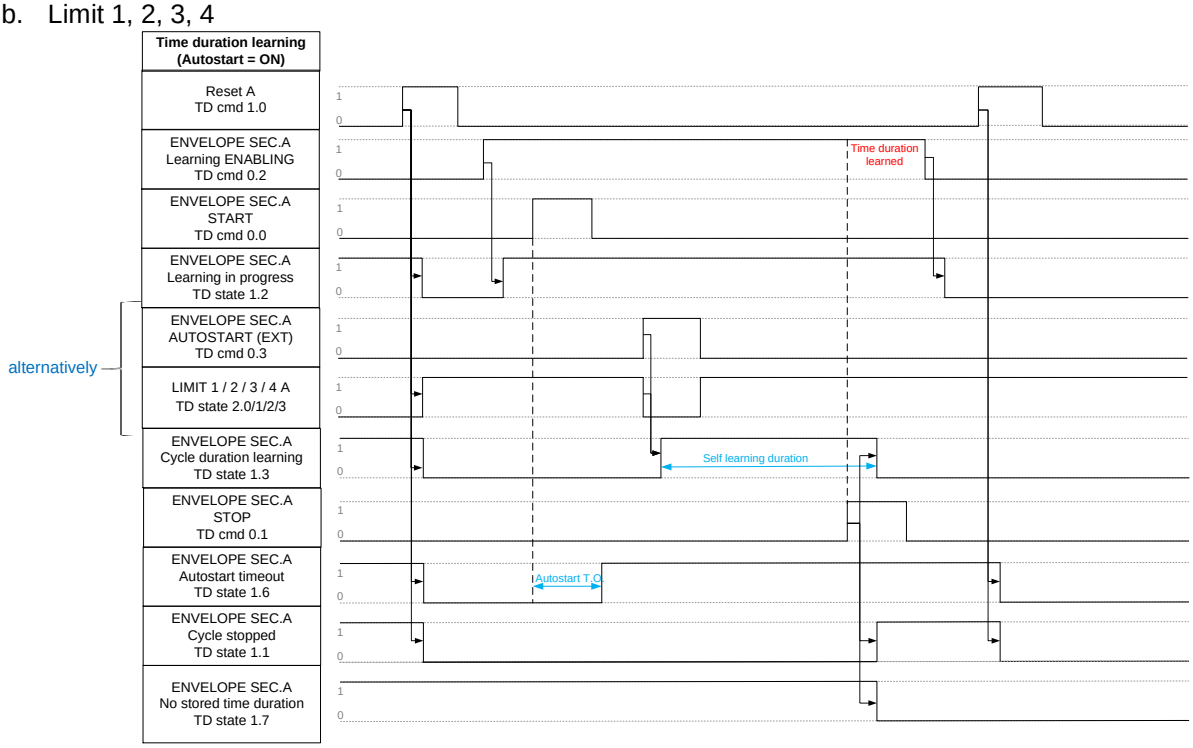
Note:

- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after learned process duration plus timeout value defined on related parameter.

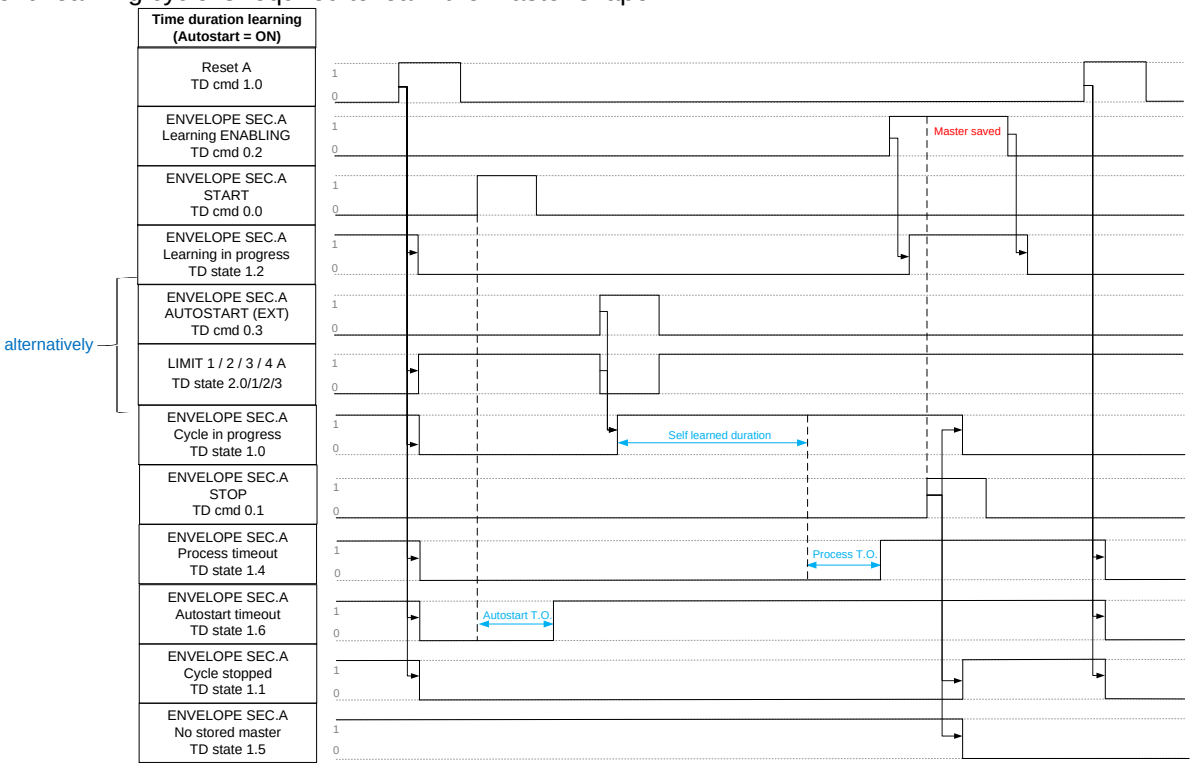
3.2.2.5.4 Master learning (with Self learning duration = ON and Austostart = ON)

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



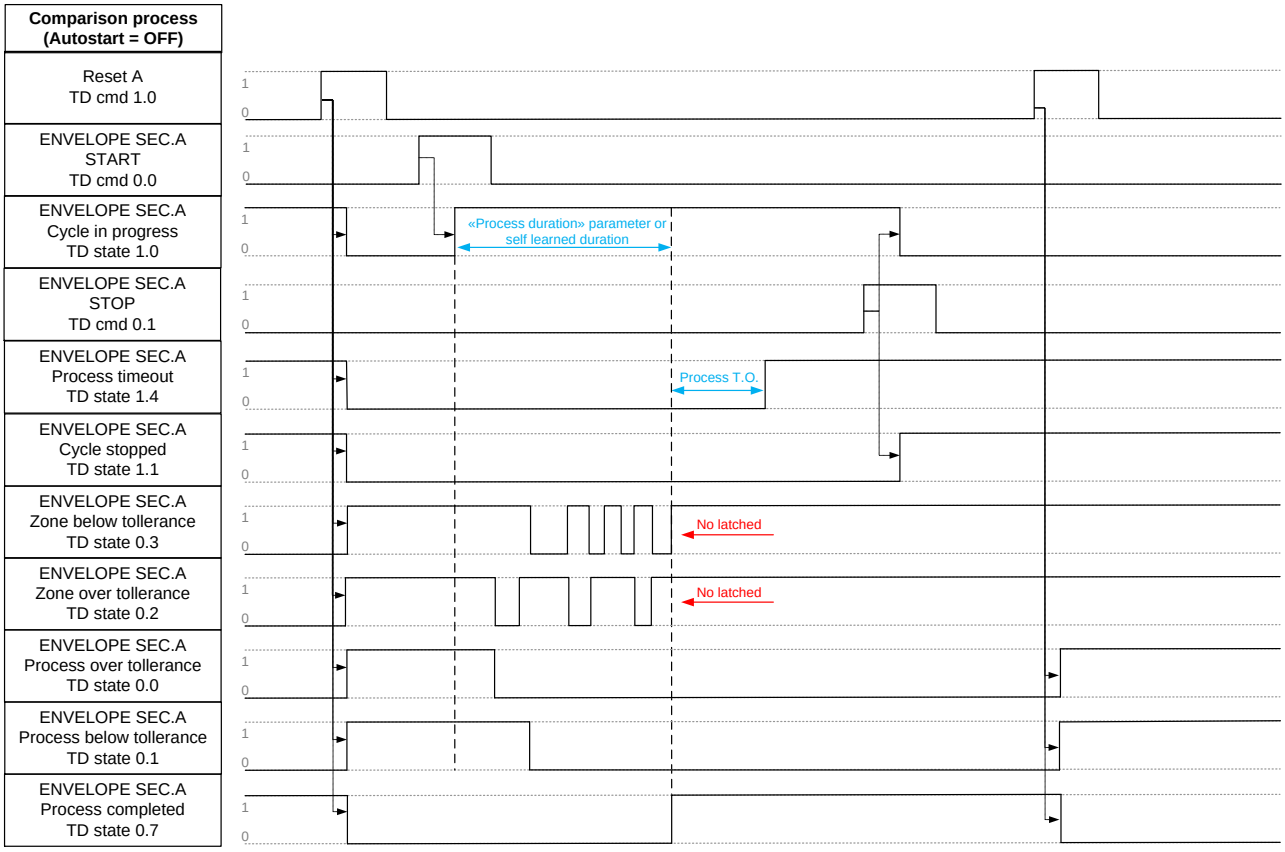
Second learning cycle is required to learn the master shape.



Note:

- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after learned process duration plus timeout value defined on related parameter.

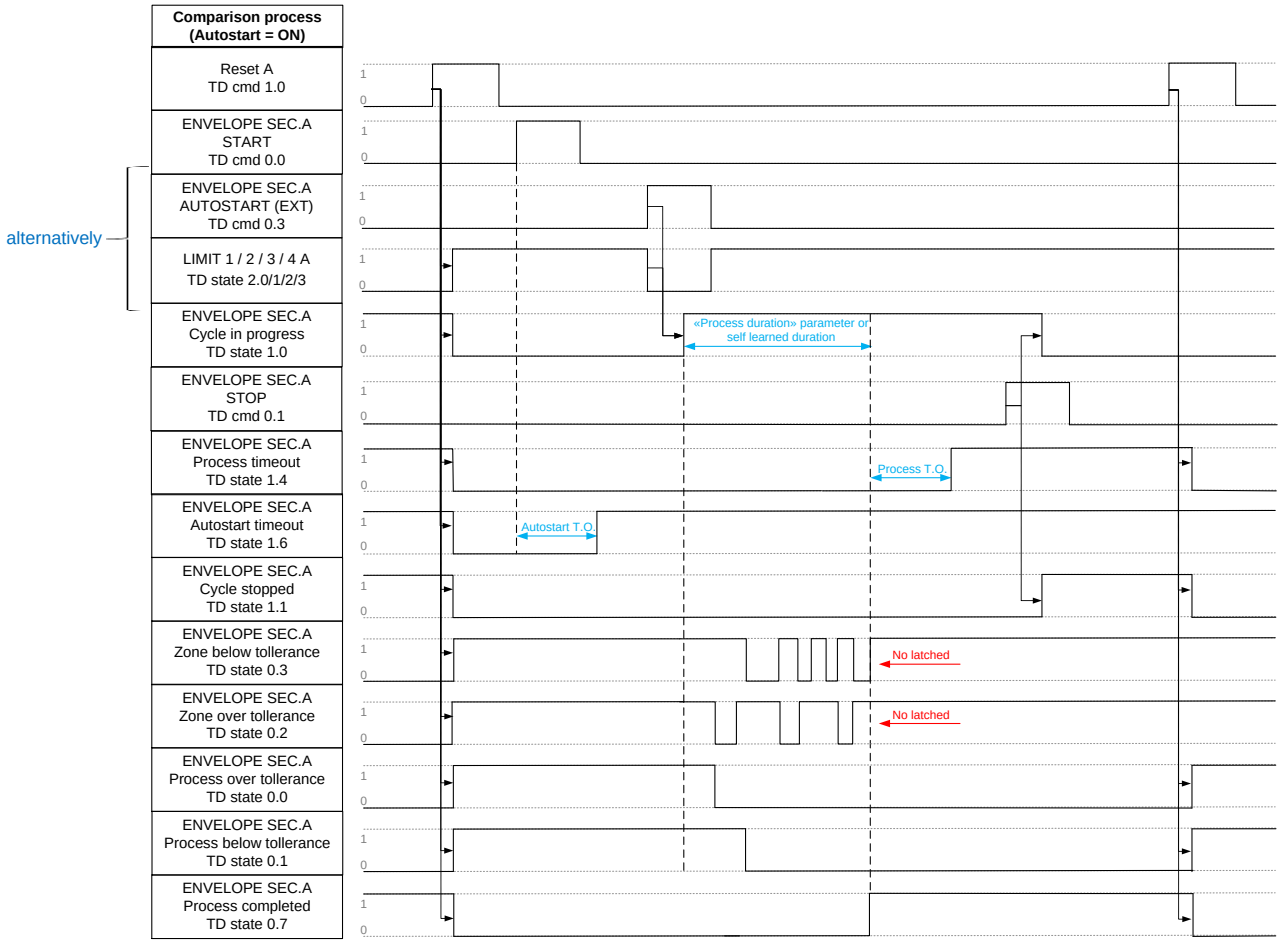
3.2.2.5.5 Comparison process (with Autostart = OFF)



Note:

- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after process duration (learned or defined by related parameter) plus timeout value.

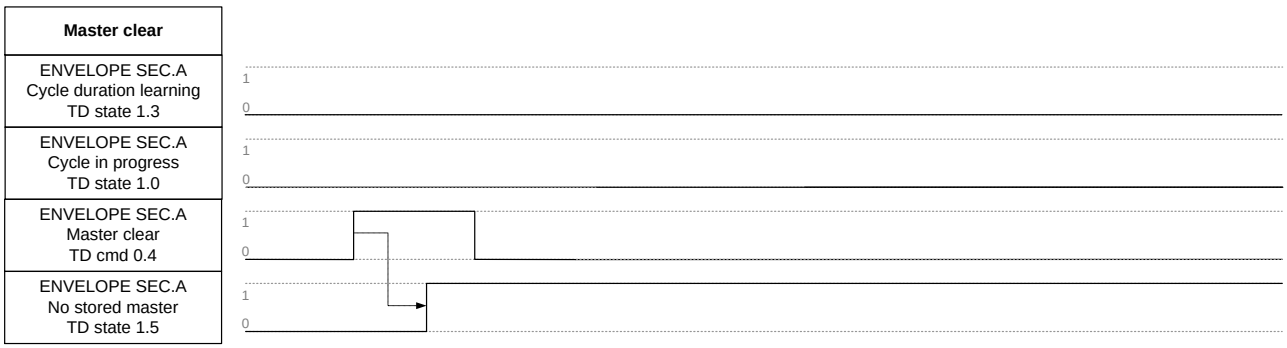
3.2.2.5.6 Comparison process (with Autostart = ON)



Note:

- Process timeout output is activated if stop signal (TD cmd 0.1) has not been sent after process duration (learned or defined by related parameter) plus timeout value.

3.2.2.5.7 Master clear



4. Gauge [GA type]

4.1. Signals logic on Profibus DP / ProfiNET

The following signals are always active during the movement of the linear encoder.

GAUGE commands [AG – Section A+B]				
Section A		Section B		Description
byte	bit	byte	bit	
7	5	-		Moving speed: 0 = slow, 1 = fast
8	2	-		Stop the movement but keeping the power on
8	3	-		Abort the movement and power off. After that a RESET is needed.

4.1.1. Without handshake (default)

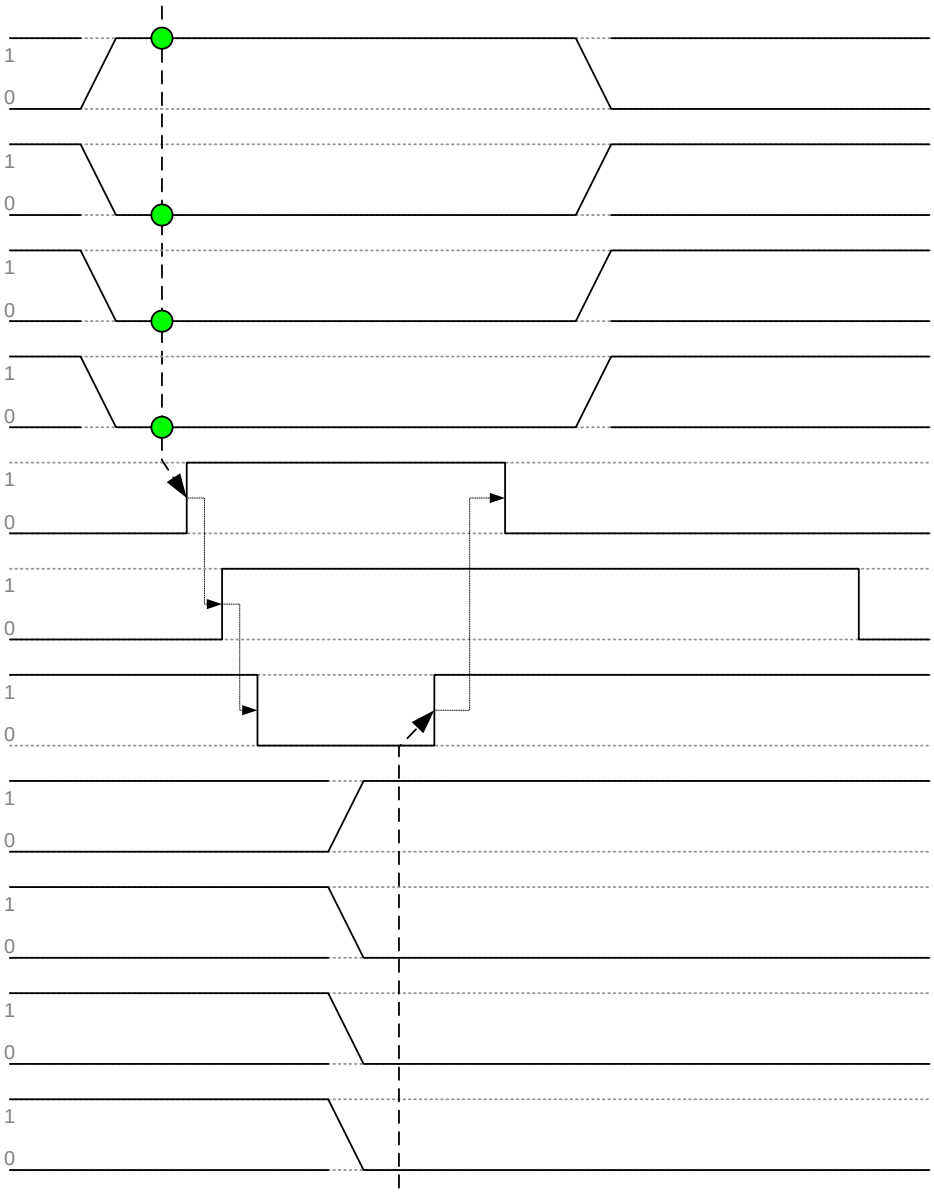
4.1.1.1. Automatic mode

See paragraph 1.

4.1.1.2. Part-Program change (Select 0, 1, 2, 3) – Example PP2 - section A

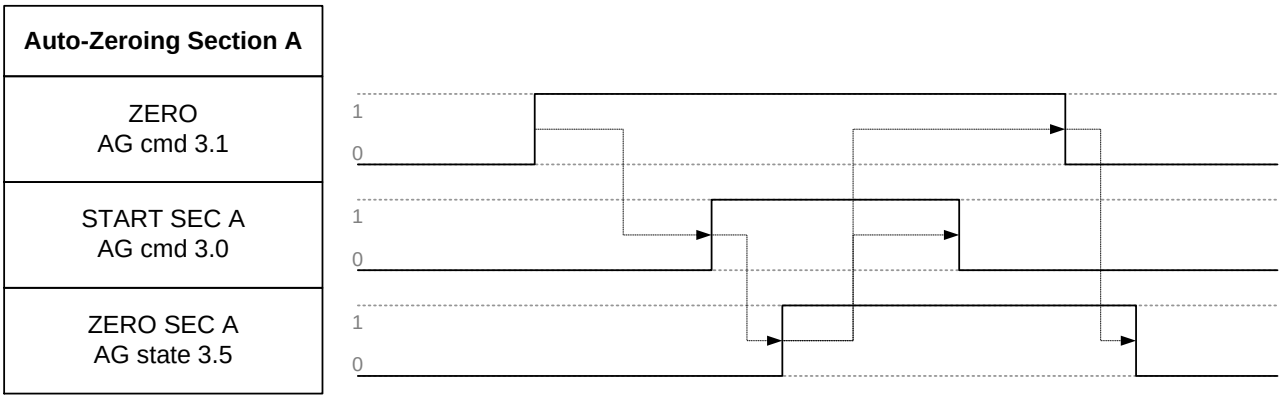
Part-program table				
Selected Part Program	Select 0	Select 1	Select 2	Select 3
1	0	0	0	0
2	1	0	0	0
3	0	1	0	0
4	1	1	0	0
5	0	0	1	0
6	1	0	1	0
7	0	1	1	0
8	1	1	1	0

Part-Program Select on Section A
SELECT 0 AG cmd 4.0
SELECT 1 AG cmd 4.1
SELECT 2 AG cmd 4.2
SELECT 3 AG cmd 4.3
PART PROGRAM CHANGE AG cmd 4.7
START SEC A AG cmd 3.0
PART-PROGRAM SEC A DATA VALID AG state 4.4
PART-PROGRAM ECHO SELECT 0 AG state 4.0
PART-PROGRAM ECHO SELECT 1 AG state 4.1
PART-PROGRAM ECHO SELECT 2 AG state 4.2
PART-PROGRAM ECHO SELECT 3 AG state 4.3

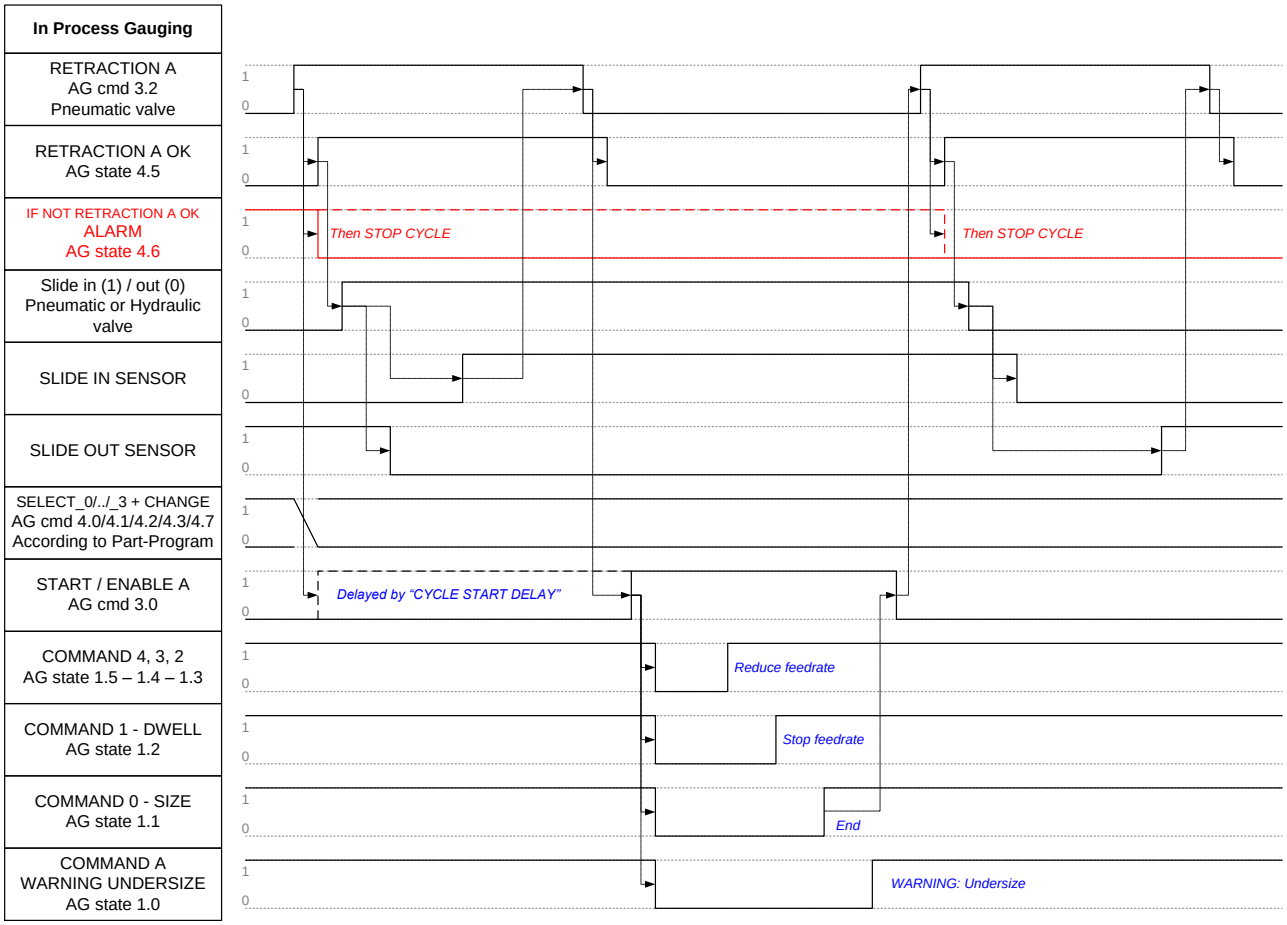


Set Part-Program 2 on Section A

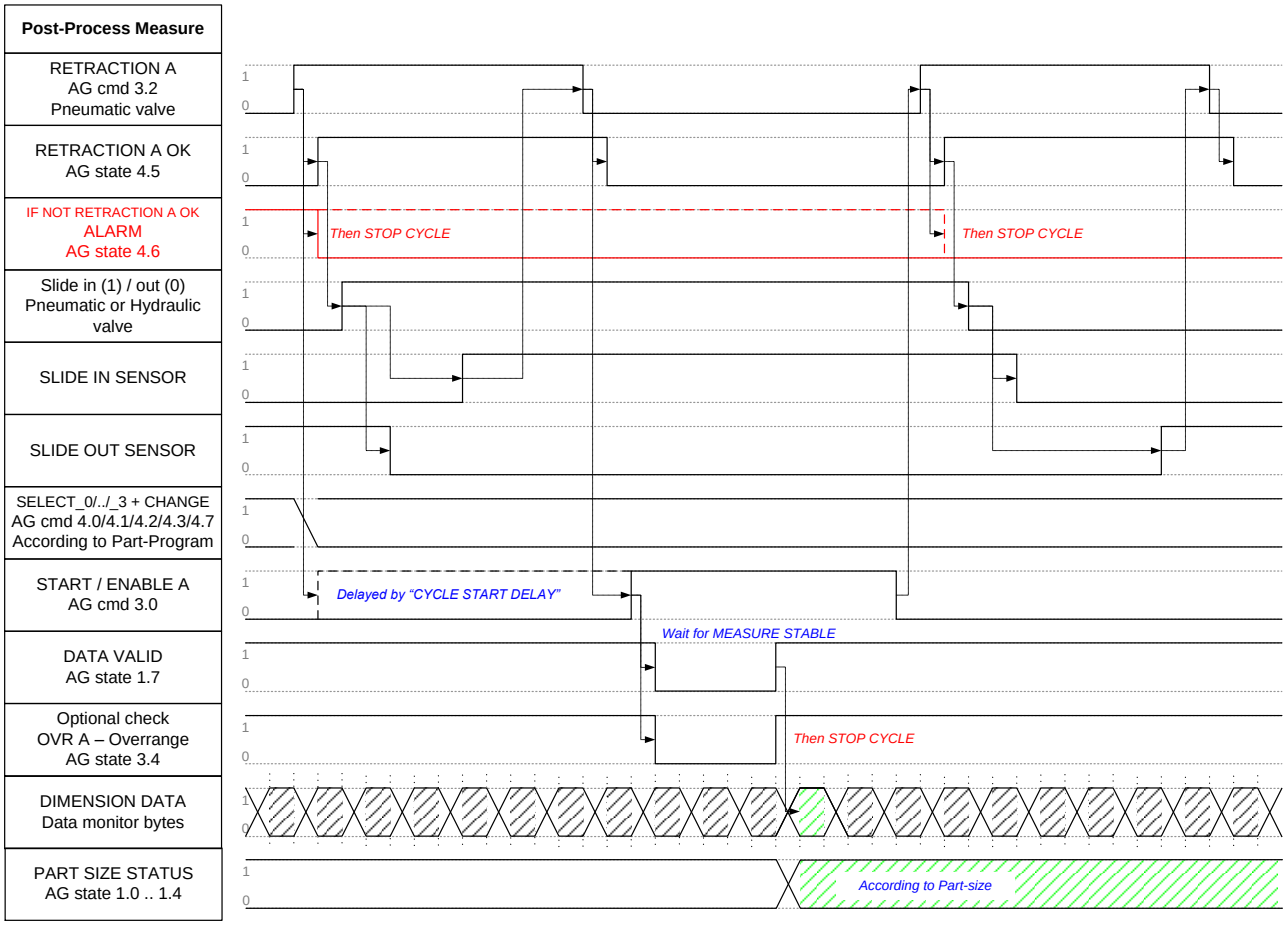
4.1.1.3. Auto-zeroing cycle (section A)



4.1.1.4. In-Process gauging cycle (section A) - Example

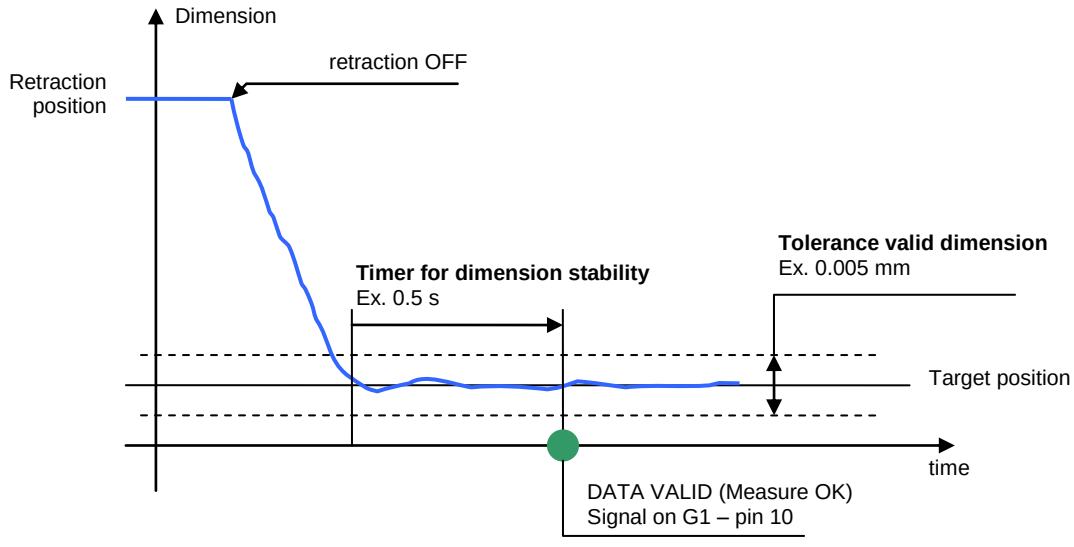


4.1.1.5. Post-process (section A) - Example



(**) 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 Parameter setup

5. Gauge [NG type]

5.1. Without handshake (default)

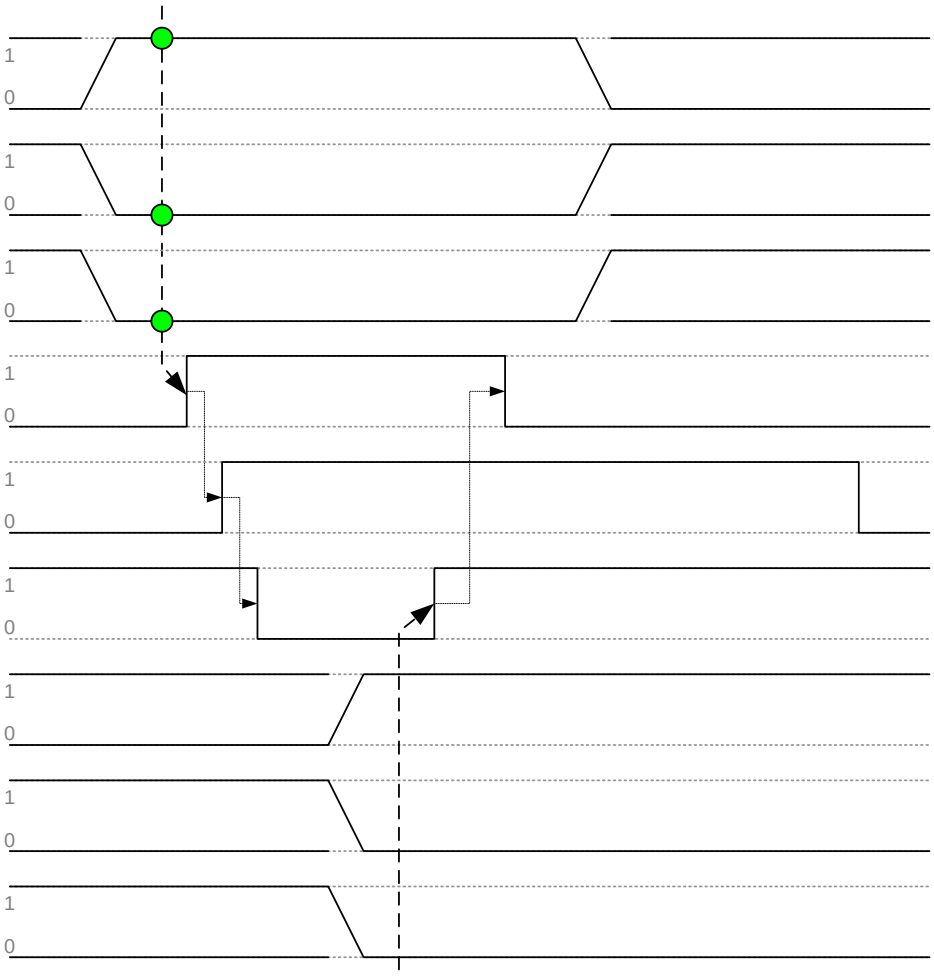
5.1.1. Automatic mode

See paragraph 1.

5.1.2. Part-Program change (Select 0, 1, 2) – Example PP2 - section A

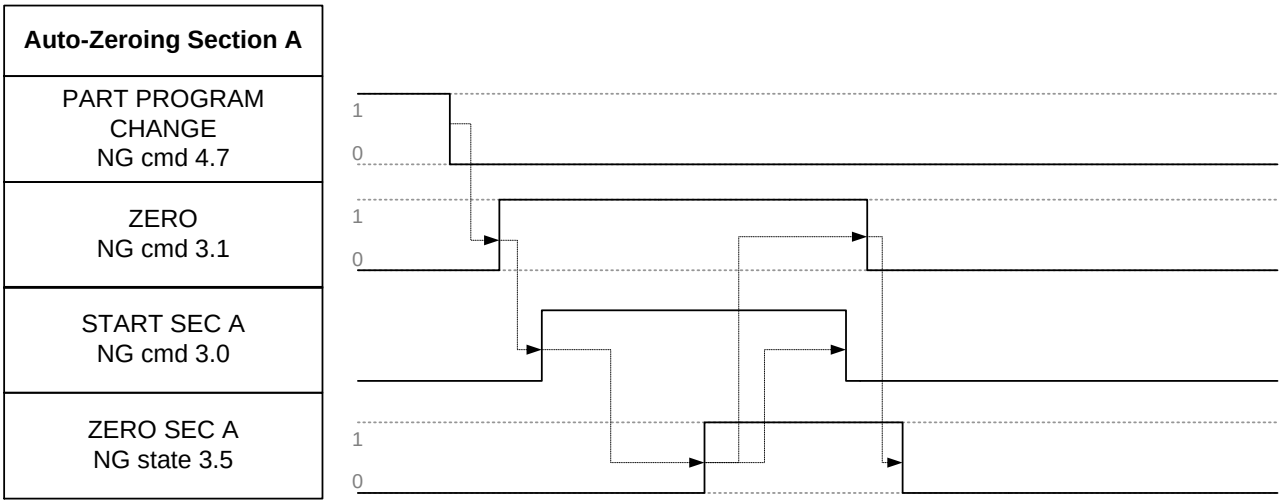
Part-program table			
Selected Part Program	**Select 0**	**Select 1**	**Select 2**
1	0	0	0
2	1	0	0
3	0	1	0
4	1	1	0
5	0	0	1
6	1	0	1
7	0	1	1
8	1	1	1

Part-Program Select on Section A
SELECT 0 NG cmd 4.0
SELECT 1 NG cmd 4.1
SELECT 2 NG cmd 4.2
PART PROGRAM CHANGE NG cmd 4.7
START SEC A NG cmd 3.0
PART-PROGRAM SEC A DATA VALID NG state 4.7
PART-PROGRAM ECHO SELECT 0 NG state 4.0
PART-PROGRAM ECHO SELECT 1 NG state 4.1
PART-PROGRAM ECHO SELECT 2 NG state 4.2

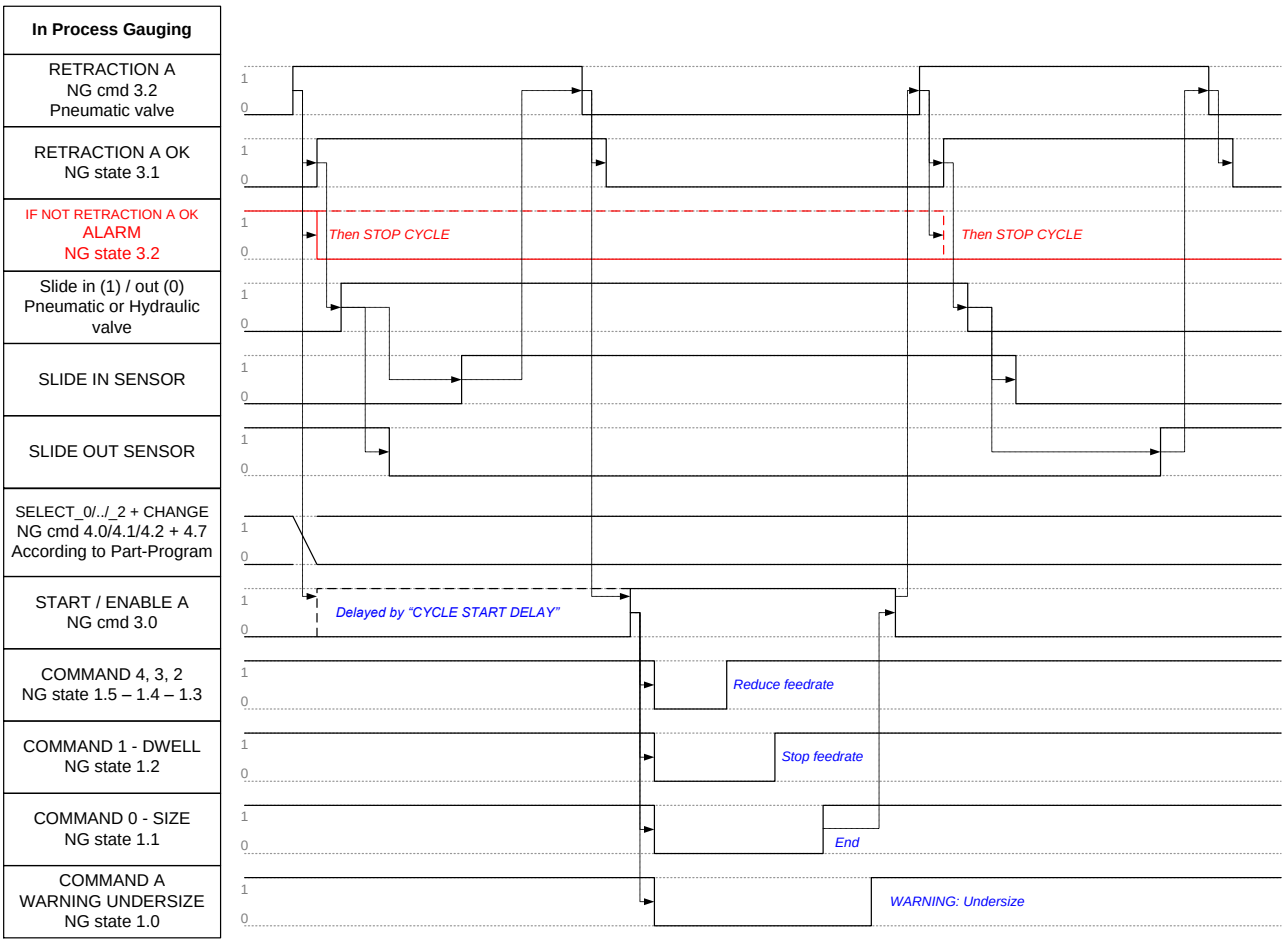


Set Part-Program 2 on Section A

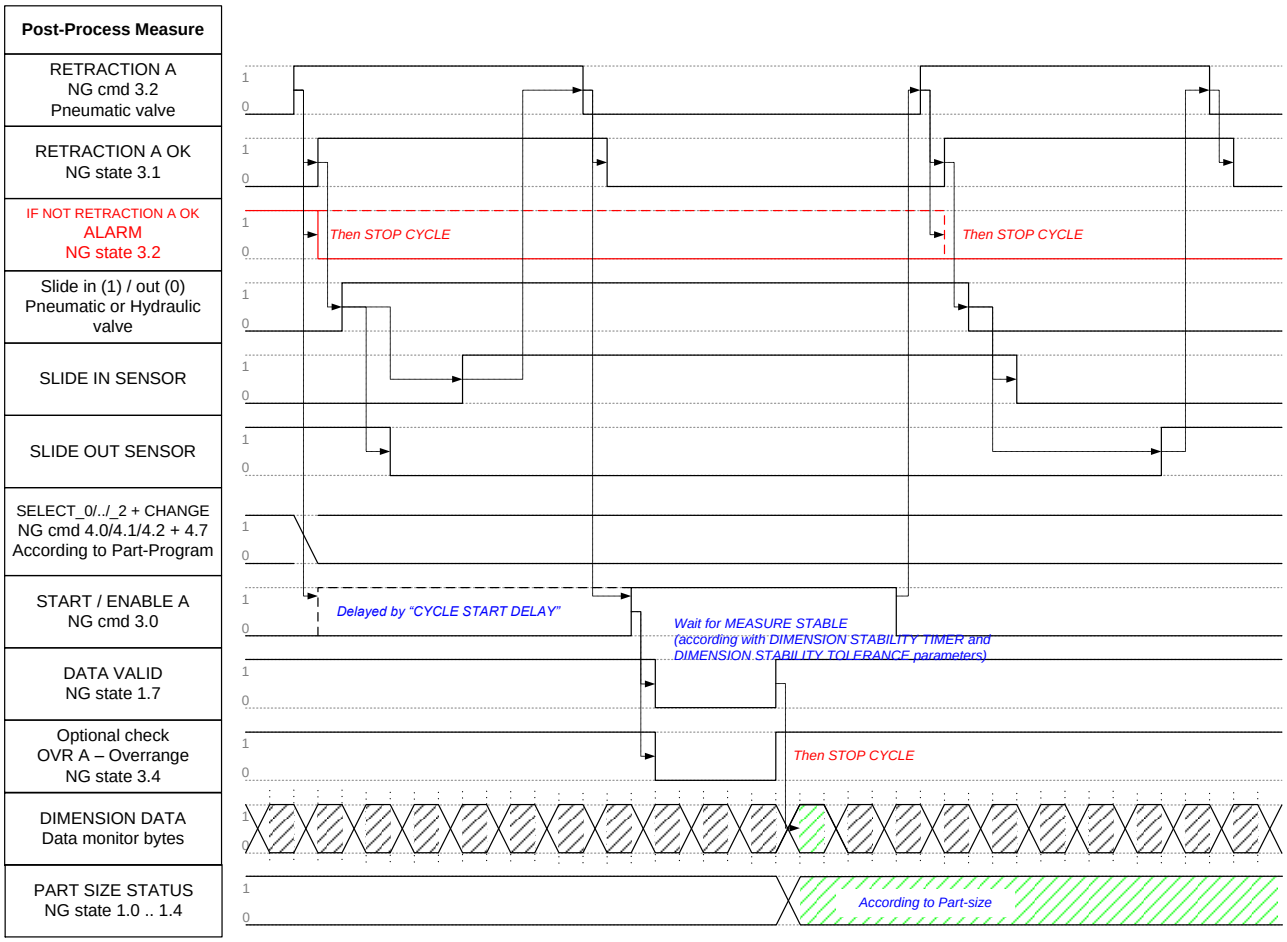
5.1.3. Auto-zeroing cycle (section A)



5.1.4. In-Process gauging cycle (section A) - Example

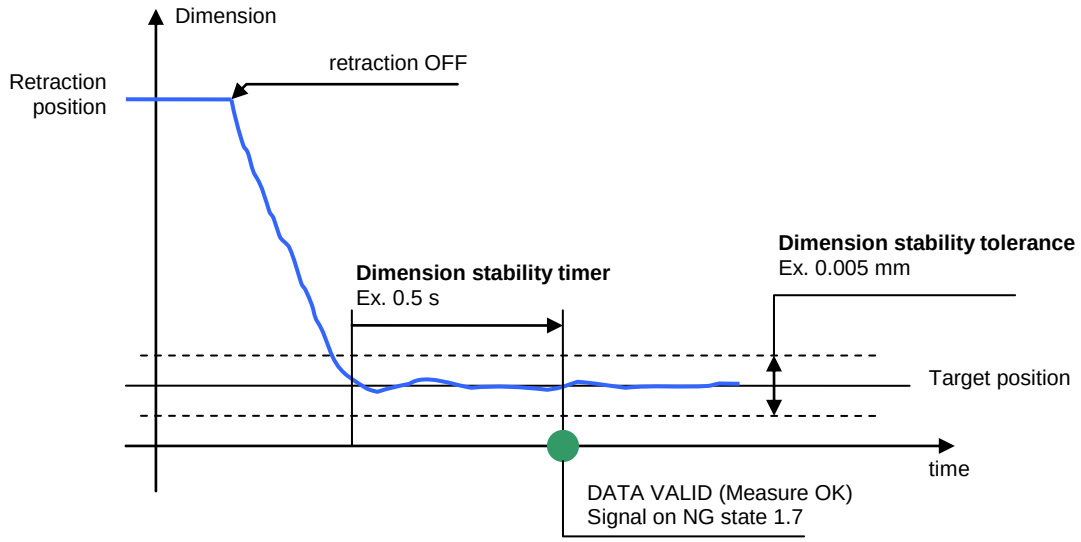


5.1.5. Post-process (section A) - Example



(**) 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 Parameter setup

6. Appendix A

Name document	Link
Multinet	“9UMEN1503-1200 yymmdd VM15 Profibus-Profinet on MN card.pdf”
Parameter setup	“9UMEN1505-1200 Parameter Setup.pdf”