OPEN DRIVE

Application n°002
Positioning system
SW Release 2.2

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OPEN DRIVE

APPLICATION : TRAPEZOIDAL PROFILE POINT - POINT POSITIONING SYSTEM

The trapezoidal profile point – point positioning on OPEN DRIVE has a working mode principle reported in Fig. 1 .
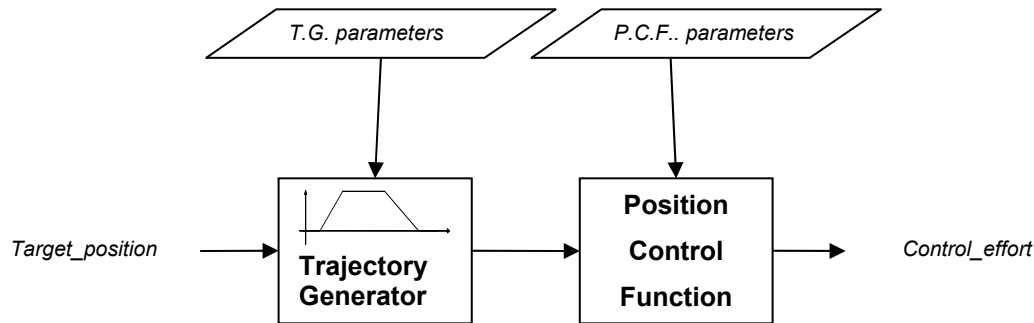

Fig. 1: P-P Positioning System (Functional Blocks)

It gives the chance to set maximum 2 different movements through the serial line or Field bus (future possibility to bring the movements up to 31).

Trajectory Generator:
Every movement (Target position) is made by the following parameterizations :
The underline target position : it is expressed with one word of 32 bit (signed) so composed :

Position MSB (16 bit)	Position LSB (16 bit)

> Position MSB and Position LSB represent the most significant 16bit and the least significant 16bit of the target position.
> If the multiplier factor is = 1 (default value Par.7), the target position is defined with maximum resolution of 16bit for mechanical revolution of the motor (position LSB goes from 0 to 65535), so the most significant16bit represent the revolutions number, the least significant 16bit represent the position related to the current revolution.
> Attention :   the target position (Position LSB and Position MSB) is in two's complement representation.
> The target position has a different meaning depending either on the use of the Absolute or Relative positioning Mode.

The *limit speed*   Par.1 and Par.1.1
The *acceleration time*   Par.1 and Par.1.1
The *deceleration time*   Par.1 and Par.1.1
The *conversion's ratio of the target positions*   Par.7

Moreover also the following parameters can be set :
The *final speed of positioning*   Par.8
The *torque feed-forward*   Par.4

3

Position Control Function

The control on the target position and on the real space is executed with every cycle of the positioning phase. However the following error is managed only during the lowering phase and the following stop in position phase. The position control during these phases is executed with a proportional control that has a speed request as an output. The proportional gain (Kp) of the regulator is set by the parameter P38.

The stop of the position control is parameterized by P38.: *proportional gain of the position loop (as indicated in the user's manual)*.In detail the meaning of the gain Kp of the position regulator is the following one :

by setting kp = 1 it is requested a speed equal to the maximum available (P65) with a space error related to the space run in 1 second at the maximum speed

1. DEFINITION OF THE POSITIONING TRAJECTORY (BASE)
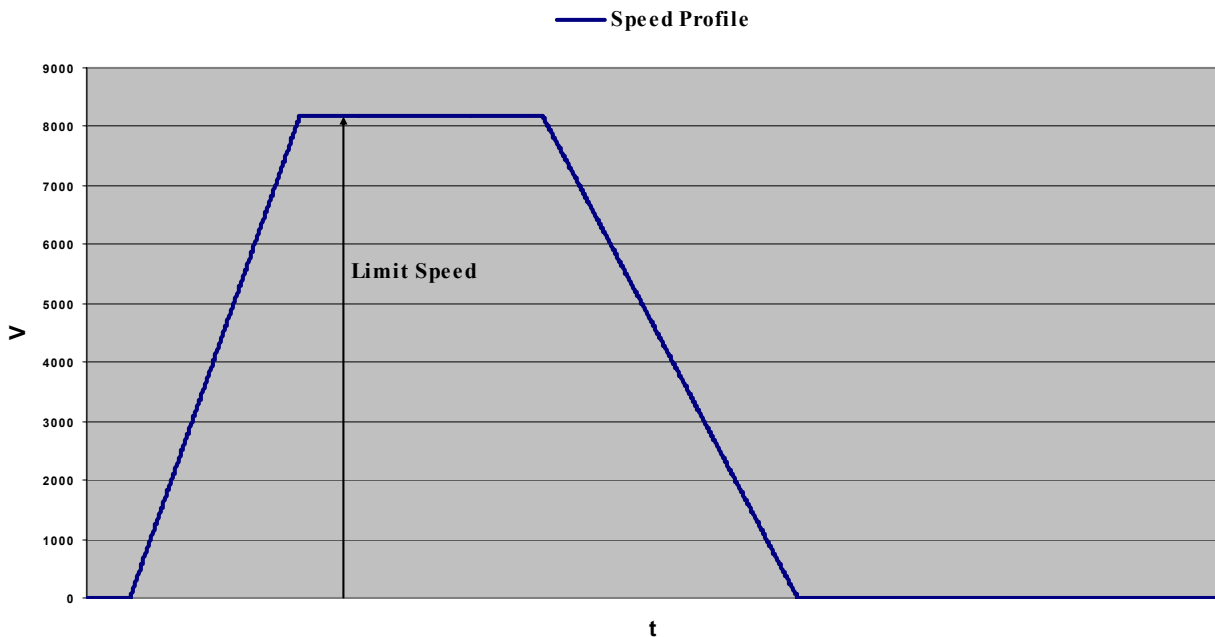
Fig. 2: Speed Profile

Once the target position is set, the trajectory is defined by the parameters :

limit speed (vlimpos) : it is the speed that the user defines as the speed at the end of the acceleration ramp of a positioning. It is expressed in % of the maximum speed of work P(65).

Acceleration time : it is the time (expressed in seconds) necessary to go from zero to the maximum working speed of the drive P(65).

Deceleration time it is the time (expressed in seconds) necessary to go from the maximum working speed of the drive P(65) to zero.

1.1. CONFIGURATION OF THE APPLICATION (BASE)

For one movement it is necessary to set the parameters for defining the Trajectory. In detail this can be done via serial line or via fieldbus by using the parameters reserved to the application (P(180)..P(200)) choosing between Movement 1 and Movement 2.

Description	Movem. 1	Movem. 2	Variation range	Default value
Target position LSB	P180	P182	0..65535	0
Target position MSB	P181	P183	+/-32767	0
Limit speed (lift ramp end)	P185	P186	0-100%	0
Acceleration time	P190	P192	0.0-100.0	0.4 [sec]
Deceleration time	P191	P193	0.0-100.0	0.4 [sec]
Space loop proportional gain	P38	P38	0.0-50.0	0.0

Table 1

Once the parameters for the movement have been defined it is necessary to set the point-point positioning modality and provider the order start movement.

To enable the function *Point-point positioning Mode* it is necessary to set C90=1, or, as an alternative, this function can be enabled by the logic input I.40=H (OR logic).
The STA*RT movement order* is taken by the OR logic between the connection C95=1 and I.29=H. The management of the start movement order can be done in various ways, see Par.1.2.
The parameters related to the trajectory (number of movement, limit speed, acceleration time and deceleration time) and the target position are referred to the moment of start movement.

Description	Order	Order	Operation between orders	Default value
Enables funct. Pos. Point-point	C90=1	I.40=H	Logic OR	0
START Movement	C95=1	I.29=H	Logic OR	0

Table 2

The *Number of movement :* the target position that has to be executed is the one set by the connection C93. As an alternative, only if C93=0, the following inputs status are read: I.30 (BIT0), I.31 (BIT1), I.32 (BIT2), I.33 (BIT3), I.34 (BIT4) and their meaning is the binary meaning of the related bits. In table 3 we show some example to recall Movement 1 and Movement 2.

Movement	BIT4 (I.34)	BIT3 (I.33)	BIT2 (I.32)	BIT1 (I.31)	BIT0 (I.30)	C93		Default value
Movement1	L	L	L	L	H	1		0
Movement2	L	L	L	H	L	2		0

Table 3

1.2. MANAGEMENT OF THE START MOVEMENT

The order *START movement* is taken by the logical OR between the connection C95=1 and I.29=H.
3 different management modalities of the order START movement are available, depending on the connection value **c91.**

- **C91 = 0** :START Movement is taken on the leading edge of the order(L->H).

- **C91 = 1 :** START Movement is taken on the status of the signal. If the signal is H, upon the movement end there is a following start. *Continuous Positioning*.

- **C91 = 2** : the START Movement is taken on the status of the signal as in the previous item but if the order remains H, when the movement ends, there is a Return Movement. Specifically, with the Positioning with incremental target positions (c92=0), when the upon the end of the Movement, there is a return movement equal to the corresponding target position with opposite sign. If the positioning has Absolute target positions one(c92=1), upon the end of the Movement, the Return movement occurs at the initial target position of the cycle. *Continuous Alternative Positioning*.

- **C91 = 3** : the START Movement is taken on the status of the signal. If the order remains H, when the movement ends, there is a Return Movement. In this case, GO Movement and Return Movement are completely settable as follow:
  Go Movement: corresponds to the current Movement. E.g., C93=1 corresponds to Movement 1, otherwise the Return Movement corresponds to the other (with C93=1 it corresponds to Movement 2). *Continuous Alternative Positioning with two Movements*.

When C91=1 or C91=2, the internal size **d52** counts the number of cycles started by the Movements' sequence. E.g. d52=0 no Movement started yet, d52=1, Movement '1' has been started. If the Positioning is a Continuous Alternative one, d52 odd means the ongoing Start Movement, d52 pair means the start of the return Movement . _d52 is reset when the order START is taken away or the Drive switched off.

The logical output **O.23** (START_ACKNOLEDGE) is brought up when it has taken the START Movement, it is brought down at the end of the leading ramp.

2. ABSOLUTE/INCREMENTAL TARGET POSITIONS

The target positions have a different meaning if we use the *Incremental* or *Absolute* point-point positioning mode (**C92** see tab 4).

- **Incremental:** the target position refers to the current position of the motor at the moment of START
- **Absolute:** the target position refers to the zero of the internal counter of position showed by the internal sizes d54 (Low) and d55 (High).

Description	Order	Default value
Incremental/absolute target position selection	C92=0 Incremental C92=1 Absolute	0

Table 4

The internal counter of position can be reset in two ways : bringing to H the logical input **I.41** OR bringing to 1 the logical connection **C97**. The zero setting is on the leading edge L -> H.
The logical connection c97 is brought to zero by the application when the zero setting is done.

Description	Order	Order	Operation between orders	Default value
Zero setting of internal counter	C97=1	I.41=H	Logic OR	0

Table 5

Note : the internal counter is reset also when a HOMING function ends. (see Par.10).

3. VARIATION OF THE MAX. SPEED OF POSITIONING ON LINE

The positioning speed can be changed on line by changing the value of the limit speed. The speed change is taken only during the linear part and any time the leading ramp has ended and before starting the return ramp. The settable speed is expressed in % of the limit speed of the application.

The speed change can occur with or without the ramps' insertion as on the speed regulator. The insertion or not of the ramps depends on how the connection **c26** is set, their duration depends on the parameters P21, P22, P23, P24 as described in the User's Manual.
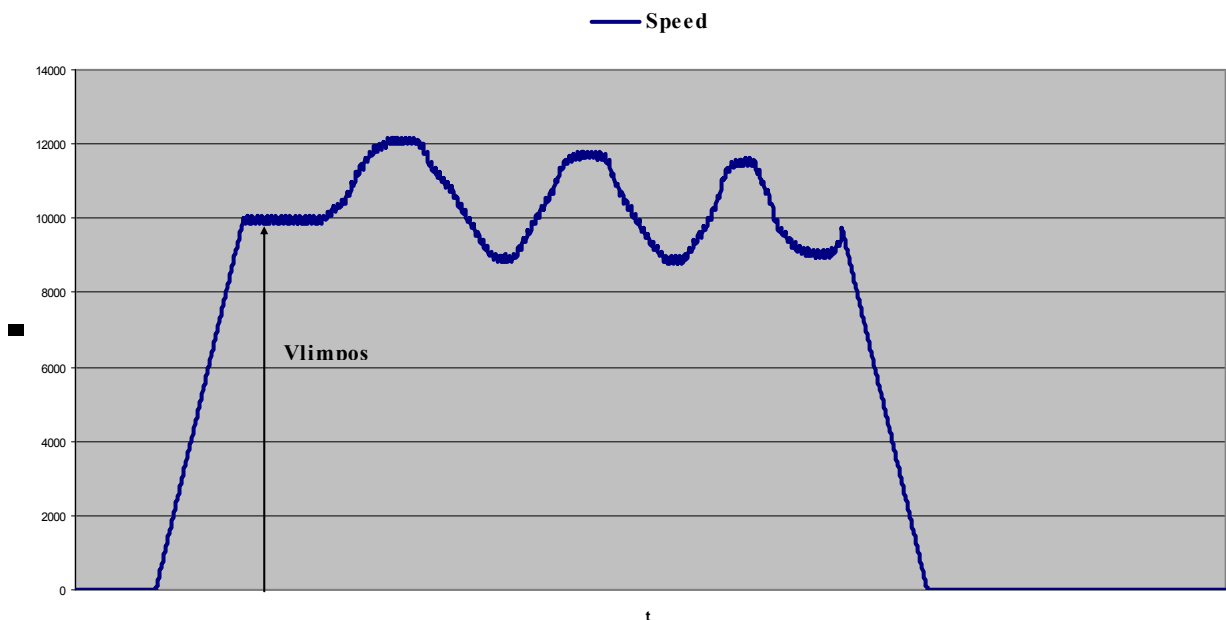

Fig. 3: On line speed variation

To establish the positioning speed it is necessary to set the connection **c96**.
With c96=0 the positioning limit speed is taken by the parameters P185 for Movement 1, P186 for Movement 2 (expressed in percentage of the maximum speed of work p65).
With c96=1 the positioning limit speed is set according to the speed reference, in percent of the maximum speed of work, considered in absolute value.(as described in the User's Manual).

- **C96 = 0**: the positioning speed limit is taken by the parameters P185 for movement 1, P186 for movement 2 (expressed in percentage of the maximum speed of work p65).
- **C96 = 1**: the positioning limit speed is set as for the speed reference, in percentage of the maximum speed of work, considered in the absolute value.(as described in the "Standard Application Manual of Closed Loop "' in Par.2.1). The considered reference is available at the scheme of Par.2.0 *"f_somma_tot"*).

Description	Connection	vlimpos	Default value
Limit speed	C96=0	As on Table 1	0
Limit speed	C96=1	As on speed reference	0

Table 6

The speed value at the end of the acceleration ramp depends on c96 as well, as described in Table 6 and it is taken upon the START Movement .

Warning: the function 'invert reference' (I.12 or c.36) must not be used in Positioning System Mode.

4. TORQUE FEED FORWARD

Setting the parameter **P194** with a value different from zero, it is possible to give a torque feed forward to the motor, during the acceleration and deceleration phases in order to compensate the motor-load inertia. P194 is expressed in [s] and it represents the necessary time to bring the motor-load coupling from zero to the maximum speed of work (p65) with the rated (current) torque.

—— **Torque feed-forward (current component)**
—— **Speed**
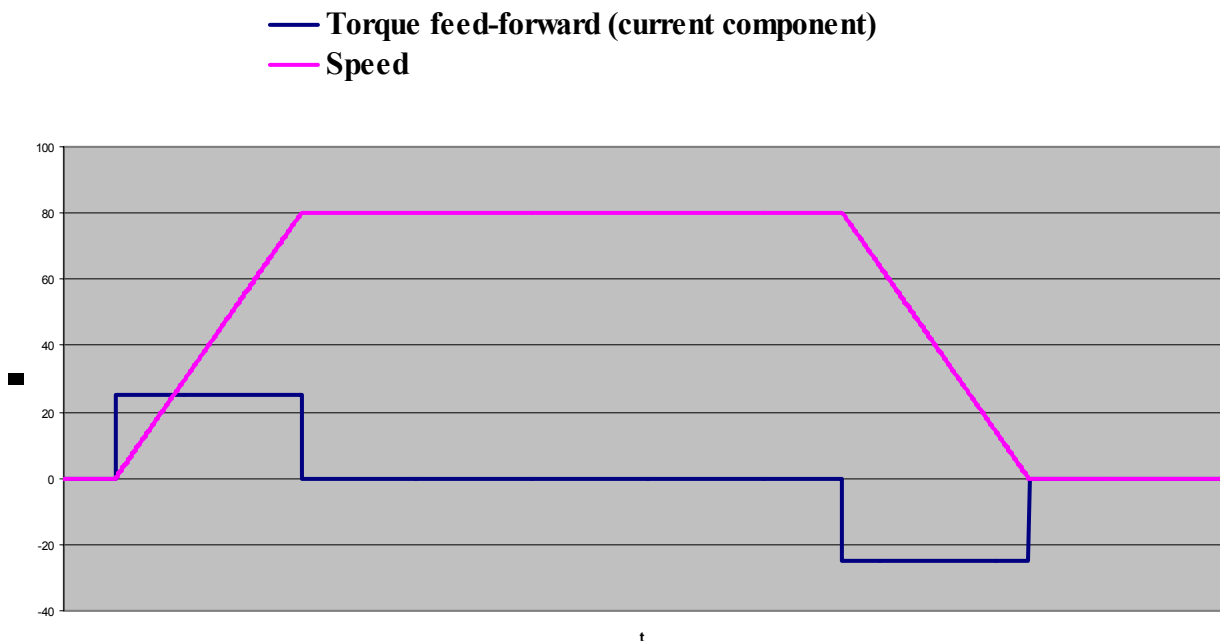
Fig. 4: Speed and Feed Forward Torque component

The feed-forward torque is generated by an additional time for the request of Iff current. This component of the current's request, for the acceleration part, is calculated by the following formula : Iff=In*Taff/Tacc. In the same way it is calculated for the deceleration part.

Iff = feed-forward component of the torque current.
In = rated current of the motor.
Taff = feed-forward acceleration time(P194)
Tacc = acceleration time required

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5. EMERGENCY RAMP (QUICK STOP FUNCTION)

The emergency ramp (Quick stop active) is called by the settable Quick Stop Command and it brings the axis in the status of HALT. In this status the speed control is managed by a lowering ramp with deceleration equal to the HOMING one (**P198**) up to the speed equal to zero. When the speed is zero the axis is kept stopped in torque. The HALT status is reset going out of gear or removing the START Movement Command. At the end of the lowering, with speed equal to zero, the output Target Reached becomes active for a time of 20ms (Par.6.1).

The **Quick STOP command** is taken by the logical OR of the following events :
- I.36 = H (QUICK STOP COMMAND)
- I.37 = L (NEGATIVE LIMIT SWITCH): if the axis speed is negative
- I.38 = L (POSITIVE LIMIT SWITCH): if the axis speed is positive
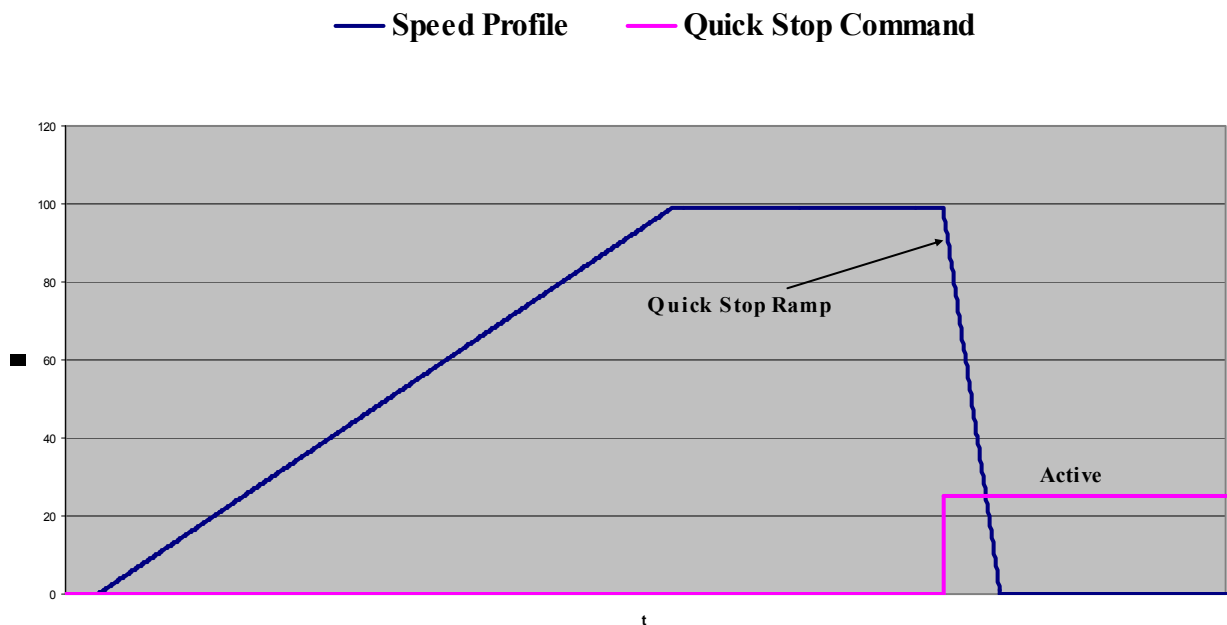
Fig. 5: Emergency Ramp

Note: Limit switches I.37 and I.38 if not used (=always to logic state Low) are not considered. Whenever one of them is used (=logic state High), since that, they both must be correctly managed. This allows the user to not to configure both of them and not to be forced to manage them.

6. POSITION CONTROL' S OUTPUTS

6.1. TARGET REACHED OUTPUT

The output O.21 indicates the reaching of the target and it has different meaning depending on the Working Mode :

POSITION: with the Positioning point-point working mode, the *target reached output* is brought up when the axis reaches the target position in the 'Position Window' (**P184**) for a bond period 'position window time' settable in P.222 (0÷5000ms) see Figure 6.
The 'Target position' window (P184) defines a symmetric window around the Target position.
Remark: the target position is reached <u>only</u> when Target Reached = 1, the next start movement is taken only if the target reached has been reached.
Remark: P184 is <u>always</u> referred to the mechanic position on the revolution (from 0 to 65535), and it is not related to NUM and DEN value (Par.7).

Accepted Position Range

Position window   Position window

Position

1   target reached

Position not reached   Position not reached

Target position
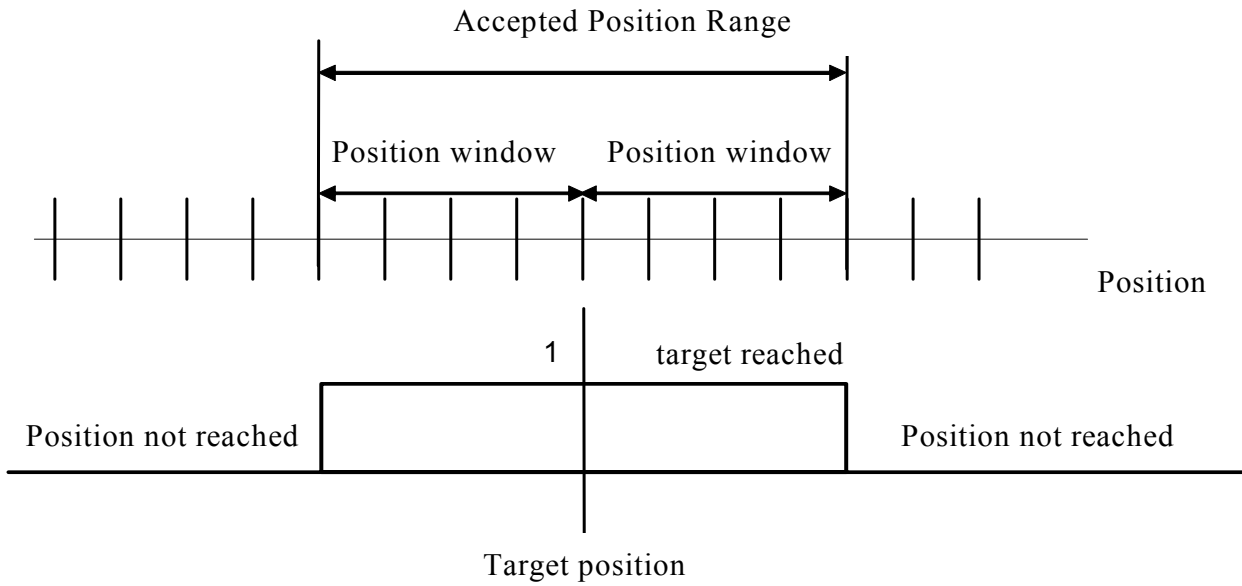
Fig. 6:Position Window

HOMING (see Application) is brought up when it is completed the reaching of the zero offset as for POSITION.

QUICK STOP FUNCTION (Par.5) is brought up at the end of the lowering ramp (with standstill motor), without waiting period.

6.2. FOLLOWING ERROR OUTPUT

The O.22 output represents the following error. It is controlled during the phase of the lowering ramp of the Positioning system and the following phase of stop in position. Around the reference position, symmetrically, it is defined a window (following error window) as wide as 'Position Window' (**P184**). If the axis is outside this window, the *following error is* 1, if it is inside, the following error is 0.

Accepted error tolerance

Following error   Following error
window   window

Position

Following error=1   Following error=1

Reference
position

Fig. 7:Following Error

6.3. START ACKNOLEDGE OUTPUT

The **O.23 output,** indicates that the START movement command has been acknowledged by the Drive. The O.23 = H output is brought down once the START command is brought down.

6.4. CAM SWITCH

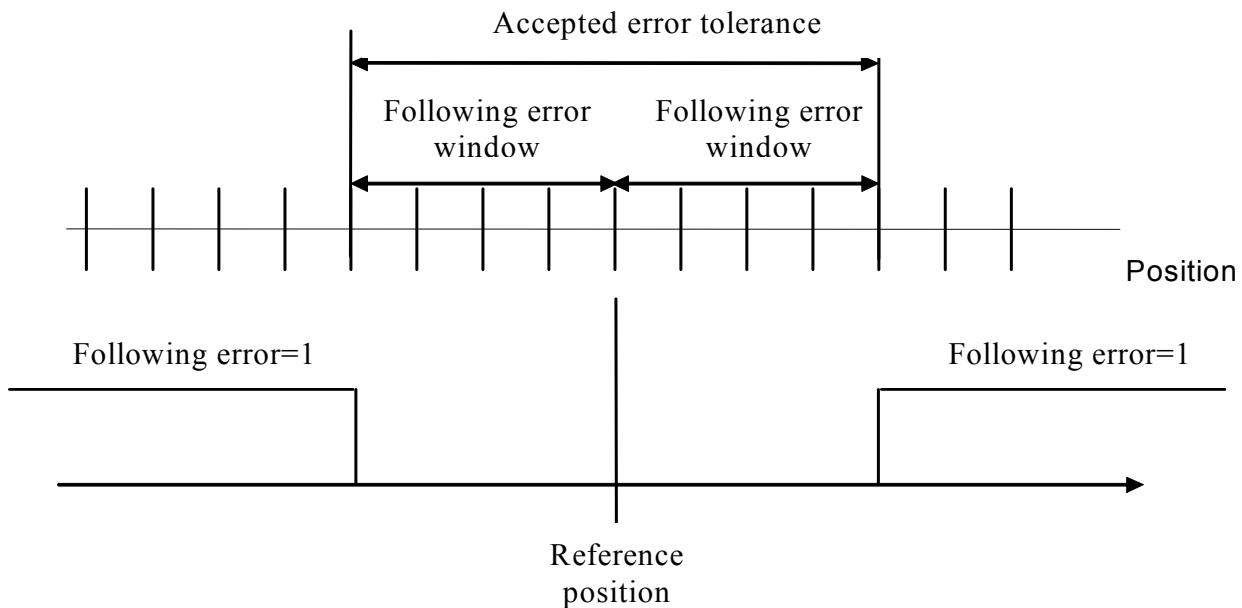The function cam_switch brings logic outputs (o.29, o.30, o.31) to logic state HIGH whenever the axle is in a position inside the interval defined between cam_ini and cam_end. The outputs go to the logic state LOW when the axle is outside the defined interval.
Cam_ini and cam_end are defined by parameters from 200 to 299 (EXTRA PARAMETERS) of the monitor supervisor.

o.29 = output cam switch 1
o.30 = output cam switch 2
o.31 = output cam switch 3

cam1_ini_l	=	**P.210**	[Pulses]
cam1_ini_h	=	**P.211**	[N. revolutions]
cam1_end_l	=	**P.212**	[Pulses]
cam1_end_h	=	**P.213**	[N. revolutions]
cam2_ini_l	=	**P.214**	[Pulses]
cam2_ini_h	=	**P.215**	[N. revolutions]
cam2_end_l	=	**P.216**	[Pulses]
cam2_end_h	=	**P.217**	[N. revolutions]
cam3_ini_l	=	**P.218**	[Pulses]
cam3_ini_h	=	**P.219**	[N. revolutions]
cam3_end_l	=	**P.220**	[Pulses]
cam3_end_h	=	**P.221**	[N. revolutions]

Note: the refreshing time of the outputs is equal to the speed loop cycle time (200us@5kHz PWM).

7. SET OF THE RATE IN ENGINEERING UNITS.

The value of the target position is multiplied by the conversion ratio of the rates expressed by NUM/DEN where NUM=P188 and DEN=P189. The real rate run by the axis is so equal to :

 Real position=Target Position * (NUM / DEN)

In this way it is possible to express the Target Position in engineering units :
E.g. : if the target position has to be expressed in tenths of millimeter and the axis moves of 1 mm every 300 motor revolutions, it has to be set NUM=300 and DEN=10. At this point it is possible to express the Target Position in <u>tenths of mm.</u>

Note 1 :
the Real Position managed by the Drive must never exceed the maximum rate of +/-32767 revolutions. So Target position* (NUM / DEN) must never exceed this limit.

Note 2:
the limit resolution guaranteed on the Real Position is equal to 24bit (5.96*10e-8). For positions with a higher resolution it is necessary to set NUM=DEN so that the Real and Target Position are the same, not counting the function NUM/DEN.

Note3: the conversion ratio NUM/DEN is active <u>only</u> on the positions set by the customer (Movement positions and Homing Offset). It does <u>not</u> work on the positions displayed and on the 'Position Window' (Par.6.1 and Par.6.2) that are always referring to the mechanic revolutions of the motor.

8. POSITIONING FINAL SPEED

It is possible to set a positioning final speed different from zero, by setting the parameter P187. In this way the position is reached at the speed set as positioning final speed, over which the axis goes on only in speed control (see Fig 8). The positioning final speed (vfinpos) is expressed in % of the maximum speed (p65).
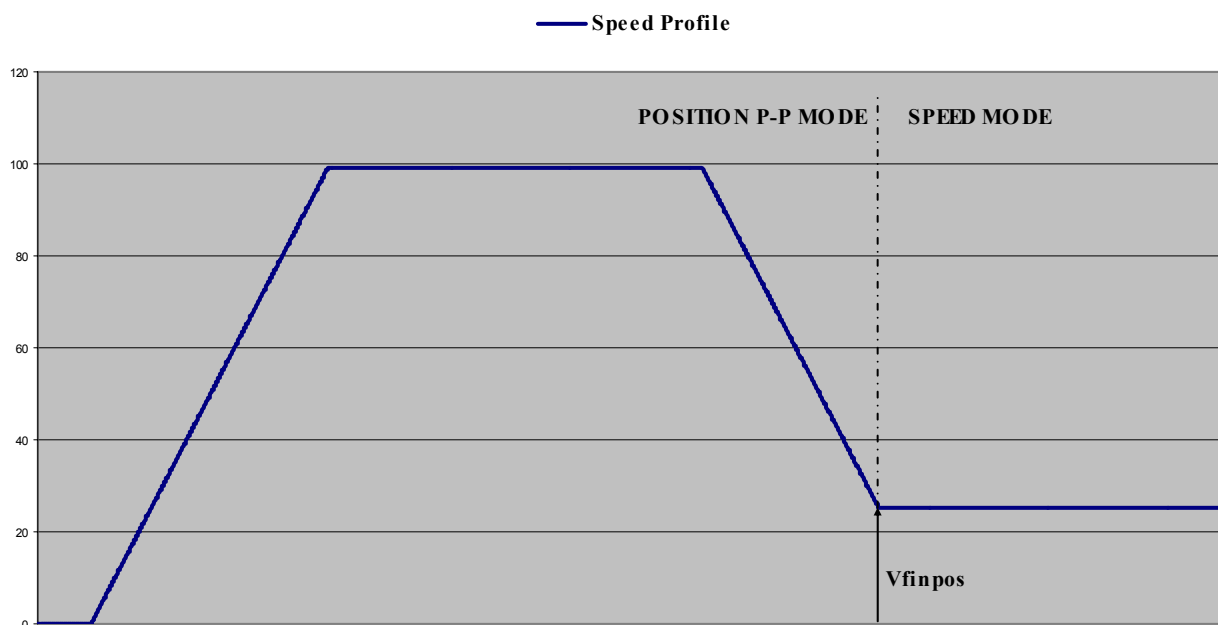

Fig. 8: Positioning Final Speed

9. APPLICATION VARIABLES TABLE :

Summary of the application's parameters

		OPENDRIVE POSITIONING SYSTEM			
P	180	POSITION 1-LSB	0÷65535	0	Pulses
P	181	QUOTA1-MSB	-32767÷32767	0	N revolut.
P	182	QUOTA2-LSB	0÷65535	0	Pulses
P	183	QUOTA2-MSB	-32767÷32767	0	N revolut.
P	184	Position Window	0÷65535	182	Pulses
P	185	Limit speed Movement 1	0÷16383	%	% P65
P	186	Limit speed Movement 2	0÷16383	%	% P65
P	187	Positioning final speed	0÷16383	%	% P65
P	188	NUM (multiplying factor position -numerator)	0÷16383	1	
P	189	DEN (multiplying factor position –denominator)	0÷16383	1	
P	190	Acceleration time Movement 1	0÷100.00	0.40	Seconds
P	191	Deceleration time Movement 1	0÷100.00	0.40	Seconds
P	192	Acceleration time Movement 2	0÷100.00	0.40	Seconds
P	193	Deceleration time Movement 2	0÷100.00	0.40	Seconds
P	194	Acceleration time for torque Feed Forward	0÷100.00	0.00	Seconds
P	195	POSITION0-LSB	0÷65535	0	Pulses
P	196	POSITION0-MSB	-32767÷32767	0	N revolut.
P	197	Acceleration time Homing (Movement 0)	0÷100.00	0.40	Seconds
P	198	Deceleration time Homing (Movement 0)	0÷100.00	0.40	Seconds
P	199	Limit speed Homing (Movement 0)	0÷16383	%	% P65

Summary of the application's connections

		OPENDRIVE POSITIONING SYSTEM			
C	90	Enable Positioning system Working mode PP	0,1	0	
C	91	Management of START Movement	0÷2	0 (Start on the edge)	
C	92	INCREMENTAL/ABSOLUTE positions	0,1	0 (incremental)	
C	93	Movement number	0÷2	0 (movement 0)	
C	94				
C	95	START movement command	0,1	0	
C	96	Type of speed reference (linear part)	0,1	0	
C	97	Reset counter command	0,1	0	
C	98	Homing Type	1,2	1	
C	99				

Summary of Application Internal Values

		INTERNAL VALUES	REPRESENTATION
d	50		
d	51		
d	52	Counter of Movements sequence	1
d	53	Vmaxpos (speed of the acceleration at the end of the ramp)	%
d	54	Position_read_l Absolute position	Pulses (L)
d	55	Position_read_h Absolute position	Pulses (H)
d	56	Position_lsb Required position	Pulses (L)

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d	57	Quota_msb Required position	Pulses (H)
d	58	Visua_l Position error (lowering ramp and stop in pos)	Pulses (L)
d	59	Visua_h Position error (lowering ramp and stop in pos)	Pulses (H)
d	60	Movement Number	
d	61	Application Number (2=Positioning system)	1

Summary of logical inputs

		LOGICAL INPUTS	STATUS (H=ON L=OFF)
I	29	START MOVEMENT	L-H
I	30	BIT0 (MOVEMENT CHOICE)	L-H
I	31	BIT1 (MOVEMENT CHOICE)	L-H
I	32	BIT2 (MOVEMENT CHOICE)	L-H
I	33	BIT3 (MOVEMENT CHOICE)	L-H
I	34	BIT4 (MOVEMENT CHOICE)	L-H
I	35	N.U.	L-H
I	36	QUICK STOP COMMAND (HALT)	L-H
I	37	NEGATIVE LIMIT SWITCH (NLS)	L-H
I	38	POSITIVE LIMIT SWITCH (PLS)	L-H
I	39	N.U.	L-H
I	40	SPEED MODE / POSITIONING SYSTEM MODE	L-H
I	41	ZERO SETTING ABSOLUTE POSITION COMMAND	L-H

Summary logical outputs

		LOGICAL OUTPUTS	STATUS (H=ON L=OFF)
o	21	TARGET REACHED	L-H
o	22	FOLLOWING ERROR	L-H
o	23	START ACKNOWLEDGED	L-H
o	24	HOMING ATTAINED	L-H
o	25	IN PROGRESS (POS, HOM, or QUICK STOP)	L-H
o	26	POSIZIOTIONER ENABLED	L-H
o	27	HOMING ENABLED	L-H
o	28	QUICK STOP ENABLED	L-H

Summary of Oscilloscope Internal Values

INTERNAL VALUES		REPRESENTATION
53	Rif_vel_pos	%
54	Position_read_l	Pulses
55	Position_read_h	N. revolutions
56	Quota_lsb (Target position lsb)	Pulses
57	Quota_msb (Target position msb)	N. revolutions
58	Visua_l (Position Error – only during lowering ramp and in pos)	Pulses
59	Visua_h (Position Error – only during lowering ramp and in pos)	N. revolutions
60	Rif_spa_l (Space reference lsb)	Pulses
61	Rif_spa_h (Space reference msb)	N. revolutions
62	Delta_letta_l	Pulses
63	Delta_letta_h	N. revolutions

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9.1. MANAGING OF PARAMETERS P.200 - P.299 (EXTRA)

Parameters over 200 are reserved for the application and the managing is different compared with that of P.01, P.199.
The managing can be done by using P.200, P.201, P.202, P.203 and only via serial line (or Fieldbus) from the page SPECIAL PARAMETERS of the folder P-C of the monitor supervisor OPENDRIVE.
In a similar manner as for standard parameters and connections, the managing of P.200-P.299 parameters is performed as follows: at Drive start up, the permanent Memory (FLASH) parameters are loaded, those are parameters that have been saved by the users. Whenever the permanent memory being empty (at first Drive start up) or corrupted, Default values are loaded.

P.200 is reserved and must not be written by the user.

P.201 =1: P.200 a P.299 DEFAULT values are loaded.

P.202 =1: P.200 a P.299 FLASH Memory values are loaded.

P.203 =1: P.200 a P.299 values are saved on the FLASH Memory.

		PARAMETRI EXTRA	RAPPRESENTAZIONE		
P	200	RESERVED			
P	201	P.200-P.299 DEFAULT values loading	0,1	0	
P	202	P.200-P.299 FLASH values loading	0,1	0	
P	203	P.200-P.299 saving values on the FLASH	0,1	0	
P	210	CAM 1 INI (L)	0÷65535	0	Impulsi
P	211	CAM 1 INI (H)	-32767÷32767	0	N giri
P	212	CAM 1 END (L)	0÷65535	0	Impulsi
P	213	CAM 1 END (H)	-32767÷32767	0	N giri
P	214	CAM 2 INI (L)	0÷65535	0	Impulsi
P	215	CAM 2 INI (H)	-32767÷32767	0	N giri
P	216	CAM 2 END (L)	0÷65535	0	Impulsi
P	217	CAM 2 END (H)	-32767÷32767	0	N giri
P	218	CAM 3 INI (L)	0÷65535	0	Impulsi
P	219	CAM 3 INI (H)	-32767÷32767	0	N giri
P	220	CAM 3 END (L)	0÷65535	0	Impulsi
P	221	CAM 3 END (H)	-32767÷32767	0	N giri
P	222	Position Window Time	0÷5000	0	ms

10. APPLICATION : HOMING FUNCTION.

The Homing function is used to reset the position's counter inside the Drive.
The implemented homing methods are described here below :

Method 1 (c98=1)the initial direction of the movement is negative. When the Negative Limit Switch is active, the movement stops with deceleration ramp times that are settable. The homing offset is calculated from the first zero on the right .
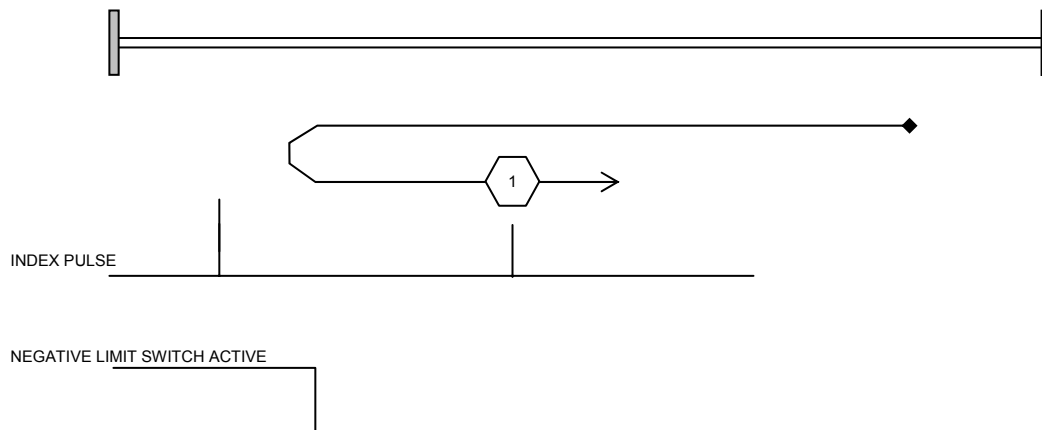
INDEX PULSE

NEGATIVE LIMIT SWITCH ACTIVE

Fig. 9: Homing method 1

Method 2: (c98=2) the initial direction of the movement is positive. When the Positive Limit Switch is active, the movement stops with deceleration ramp's times that are settable. The homing offset is calculated from the first zero on the left.
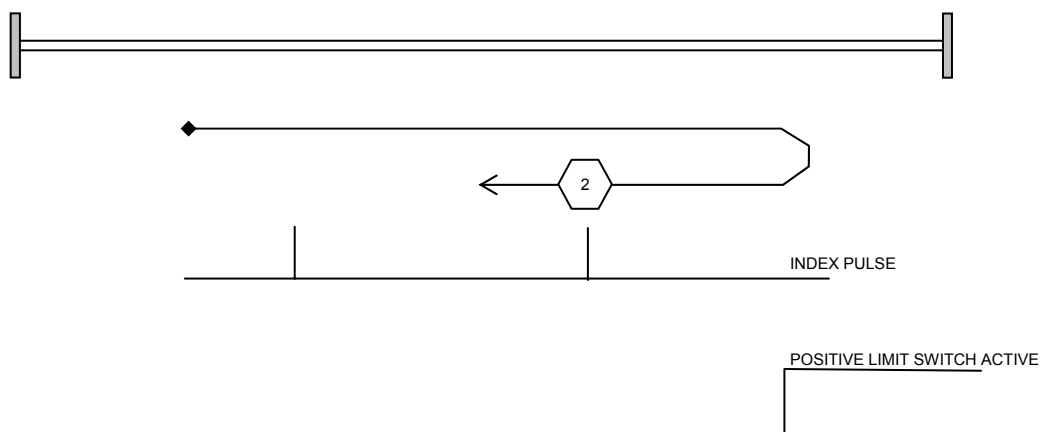
INDEX PULSE

POSITIVE LIMIT SWITCH ACTIVE

Fig. 10: Homing method 2

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10.1. SETTING THE PARAMETERS AND CONNECTIONS

Here below we provide the parameters and the connections to set for the homing (they refer to the Movement 0)

Description	Movem. 0	Variation range	Default value
Position LSB	P195	0..65535	0
Position MSB	P196	+/-32767	0
Limit speed (end of leading ramp)	P199	0-100%	0
Acceleration time	P197	0.0-100.0	0.4 [sec]
Deceleration time	P198	0.0-100.0	0.4 [sec]
Proportional gain of space loop	P38	0.0-50.0	0.0

Table 7

Position LSB and Position MSB of Movement 0 means the offset calculated respect to the zero index (e.g. zero resolver). It is expressed by a word of 32 bit (SIGNED).
The position is understood as POSITIVE if expressed along the arrow's direction (Fig.9 or Fig.10).
To enable the Homing function it is necessary to set the drive with the Positioning system point-point working mode.

Description	Command	Command	Operation between commands	Default value
Enable function Pos.Point-point	C90=1	I.40=H	Logic OR	0
START movement	C95=1	I.29=H	Logic OR	0

Table 8

During the Homing function the start must remain active. If the start becomes NOT ACTIVE the homing procedure is interrupted.
To select the zero search, it is necessary to set the movement number at zero (as shown in Table 9). Note: to recall the homing function I.30, I.31, I.32, I.33, I.34 must be L and c93=0 (see Par.1.1 OPENDRIVE positioning system).

Movement	BIT4 (I.34)	BIT3 (I.33)	BIT2 (I.32)	BIT1 (I.31)	BIT0 (I.30)	C93		Default value
Movement 0	L	L	L	L	L	0		0

Table 9

The Homing working mode (1 or 2) selected has to be set with the connection **c98.**

10.2.   LIMIT SWITCH STATUS

The LIMIT SWITCH status is given by the following events :
- I.37 = L (NEGATIVE LIMIT SWITCH): if the axis speed is negative
- I.38 = L (POSITIVE LIMIT SWITCH): if the axis speed is positive

10.3.   LOGIC OUTPUT : HOMING ATTAINED

The logic output **O.24=H** (Homing attained) means that the Homing process has been successfully attained. O.24 is brought back to the status L when a new Homing started.

TDE MACNO

Attachment information

The contents of this attachment are based on software version **Application 2.2** (d61)

If you have any queries regarding the installation or operation of the equipment illustrated within this manual, please contact the following address:

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