

CDVI Sweden AB
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Fire resistance test of door according to EN 1634-1

(4 appendices)

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in the accredited test methods:

- EN 1634-1:2014
- EN 1363-1:2012

Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

Deviations

A test report containing deviations from the test method may not be appropriate to use as a basis for certification, classification or assessment.

The specimen design, properties of included components and assembly has not been verified in accordance with the requirements of the test method.

Product:

Glazed single leaf hinged door of steel with frame of steel with swing door operator.

Product designation:

SP 35000

CDVI Digiway SR

Sponsor / owner of the report:

CDVI Sweden AB
Box 9011
400 91 GÖTEBORG

Reference number:

7P08049

RISE Research Institutes of Sweden AB

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1 Purpose of the test

The purpose of the test was to determine the fire resistance of the test specimen described in chapter 2.

2 Test specimen and test setup

2.1 General information

The test specimen consisted of one glazed single leaf hinged door of steel with frame of steel with swing door operator.

Manufacturer of the door was Stålprofil AB and manufacturer of the swing door operator was CDVI Sweden AB.

The construction of the test specimen can be seen from the sponsor's drawings and specifications in Appendix 1 and the description in chapter 2.3 below.

2.2 Sampling and delivery of the test specimen

Materials and components for assembling and mounting of the swing door operator were selected and delivered to RISE by the sponsor of test.

The sponsor delivered more material and components than needed for the test specimen. RISE randomly sampled material and components for the test specimen from what have been delivered.

The swing door operator arrived to RISE on November 28, 2017.

Materials and components for assembling and mounting of the door were selected and delivered to RISE by the manufacturer of the door.

The manufacturer only delivered one set of material and components that was needed for the test, therefore the verification of the door was not performed in accordance with EN 1363-1 chapter 6.5.

The door arrived to RISE on November 24, 2017. The glass arrived to RISE on November 28, 2017.

2.3 Description of the construction

Framework

The door frame was constructed of steel plates made of stainless steel with a nominal thickness of 1.5mm.

The threshold was a mechanical threshold mounted under the door leaf made of steel.

Insulation

The door leaf was insulated with gypsum boards with a nominal thickness of 12.5 mm.

The insulation was placed in two layers.

Strip of calcium silicate board was placed at top of the frame.

Glass

The door leaf had a glass pane mounted.

The dimensions of the glass pane in the door leaf were 835 mm x 985 mm.

The glass pane were fixed with glazing beads of steel.

A glazing tape was used along the edge of the glass pane.

Seals

A sealing strip was mounted at the door leaf on top and vertically on hinged and lock side.

A sealing strip was mounted at the door frame on top and vertically on hinged and lock side.

Door hardware

The door leaf was equipped with a swing door operator on the non-fire exposed side. The swing arm was not installed.

The door frame was equipped with a swing door operator on the fire exposed side.

The door leaf was not equipped with a lock.

The door leaf was equipped with 2 hinges . The lower part of each hinge was positioned 160 and 1860 mm respectively from the bottom edge of the test specimen.

The back edge of the door leaf was equipped with one security bolt. The security bolt was positioned 1030 mm from the bottom edge of the test specimen.

The front edge of the door leaf was equipped with two deflection limiters. One deflection limiter was positioned 90 mm from the bottom edge of the test specimen and the other 110 mm from the top edge of the test specimen.

The top and bottom edge of the door leaf was equipped with one deflection limiter each. The top deflection limiter was positioned 115 mm from the front edge of the test specimen and the bottom deflection limiter was positioned 140 mm from the front edge of the test specimen.

Information about the major components of the test specimen is tabulated below:

Table: Included components.

Component	Product designation	Manufacturer / Supplier
Door leaf	SP 35000	Stålprofil AB
Door frame	SP 35000	Stålprofil AB
Glass	SGG Keralite 5 mm	
Swing door opener	Digiway SR	CDVI Sweden AB

The information regarding the test specimen and its detailed components given in the sponsor's drawings and specifications, e.g. dimensions, quantities and physical properties, are nominal values provided by the sponsor. In case of the sponsor's drawings not corresponds with the construction of the test specimen RISE has crossed details or altered the drawings.

2.4 Number of test specimens and test direction

The test specimen was an asymmetrical separating element according to the test method. Tests are needed from both directions for a complete evaluation.

On request of the sponsor the test specimen was tested with fire against one side only. The test was performed with opening direction side out from the furnace.

The result from the test is valid only from the tested direction.

2.5 Test setup

The test setup can be seen in Appendix 2.

2.6 Supporting construction

The supporting construction was mounted in RISE's concrete frame for fire tests with opening dimension (width x height) 3020 x 3020 mm.

The supporting construction consisted of 70 mm steel studs, on each side, two layers of 12.5 mm thick paper faced gypsum plasterboards. The gaps between the boards were filled with mineral wool insulation with a nominal thickness of 45 mm and a nominal density of 40 kg/m³. The joints between the gypsum plasterboards were puttied at the outer layers.

The supporting construction was attached to the concrete frame at the upper and lower edges. The vertical sides of the supporting construction were not attached to the frame.

An opening with dimension (width x height) 1130 x 2220 mm was made in the supporting construction. The wall was reinforced around the opening with a reinforced steel stud with nominal thickness 1.25 mm. The size of the opening was specified by the sponsor. A floor extension of a solid non-combustible board was mounted at the bottom of the opening to ensure 200 mm floor at each side of the test specimen.

The supporting construction is defined as a flexible standard supporting construction group B as described in EN 1363-1.

The supporting construction was built by RISE in RISE's furnace hall.

The structure of the supporting constructions is described in the test setup in Appendix 2.

2.7 Mounting of the test specimen

The door frame was mounted in the opening with 7 screws designated Hilti concrete screw 7,5x96. The gap between the door frame and the wall was filled with stone wool.

The mounting was performed on November 28, 2017 at RISE by the manufacturer of the door and the sponsor.

2.8 Conditioning

2.8.1 Climate conditions

The test specimen was stored in RISE's furnace hall before the test. The temperature in the furnace hall was in average 17 °C and the relative humidity was in average 54 % during this time.

2.9 Verification

2.9.1 Verification of the construction of the test specimen

The verification of the test specimen being in accordance with the sponsors drawings and specifications was carried out by RISE. The verification of the swing door operator was performed on an identical test specimen randomly chosen to be used for verification, see chapter "Sampling and delivery of the test specimen". The test specimen was demounted and used for verification of the inside of the construction and material properties. The verification on details possible to check without damage the construction of the test specimen was performed on the test specimen used for the fire test.

Table: Control of materials

Material	Weight [g]
Swing door operator	8877
Mounting plate	1788
Swing arm	1061

The verification was performed on December 19, 2017.

The purpose of the control is to verify and/or determine material data and dimensions of materials and components included in the test specimen. The extent of performed measurements and applied methodology can deviate from standardized methods. The results shall therefore not be considered as formal material data.

2.9.2 Mechanical conditioning - operability test

Operability test was performed in accordance with EN 14600:2005, chapter 5.1.1.1 and EN 16034:2014, A3.2. The door leaf was operated from fully closed to fully open for 25 cycles. The door leaf opening and closing operation was performed by the door closing device.

2.9.3 Door clearances

The clearances between the door leaf and the adjacent frame members were measured prior to the test. The measuring points and the measuring results are shown in Appendix 2.

No latch bolt was active during the test.

2.9.4 Closing speed

Door leaf closing speed with plugged door closer was measured according to EN 14600:2005, chapter 5.1.1.3 and EN 16034:2014, A4.

The closing speed on the test specimen was 172 mm/s.

2.9.5 Retention force door closer

The influence of the force of the door closer exerted on the door leaf was measured in accordance with EN 1634-1: 2014, section 10.1.3 by measuring the force to open the door leaf.

The force was measured with a dynamometer attached to the handle. The force for opening the door leaf was measured to 51 N.

The force was measured with a dynamometer attached to the swing arm. The force for rotate the swing arm was measured to 34 N.

2.9.6 Ability to release

The door leaf was not equipped with any hold open equipment. No measurements were made.

2.10 Placing of test specimen on the furnace

After the mounting of the test specimen in the supporting construction the concrete frame with the supporting construction and test specimen was placed on RISE's vertical furnace.

2.10.1 Final setting

The door leaf was opened 300 mm and closed with the door closing device.

The final setting was performed just before the exposure started.

The door closing device was active during the fire test.

3 Test procedure and results

3.1 General information

The test was performed on November 30, 2017. The test lasted 68 minutes.

The test was performed on RISE's vertical furnace for fire resistance test. The maximum fire exposed area of the furnace is (width x height) 3000 x 3000 mm and the depth of the furnace is 1800 mm. The heat exposure comes from 6 propane driven burners.

3.2 Witness of test

The test was witnessed by Mr Bo-Kenneth Gustafsson, Mr Tobias Olsson and Mr Massimo DALLE Carbonare from CDVI Sweden AB and Mr Johan Ahlström, Mr Tobias Olsson and Mr Joachim Andersson from Stålprofil AB.

3.3 Fire test procedure

The fire test means in principle that the test specimen is subjected to a standardized fire exposure from one side (fire exposed side) and measurements and visual judgments are performed at the opposite side (unexposed side). The extent of the measurements and assessments depends on the sponsor's desired use of the results from the test.

3.4 Test conditions

The furnace was controlled in accordance with EN 1363-1:2012.

3.4.1 Temperatures

The furnace temperature was measured with 6 plate thermometers (PT1 – PT6). The plate thermometers were positioned approximately 100 mm from the fire exposed surface of the test specimen at the commencement of the test. The position of the thermometers can be seen in Appendix 3.

The average temperature in the furnace (average of PT1 – PT6) in relation to the standard time-temperature curve is shown in Appendix 3.

The temperature at each plate thermometer (PT1 – PT6) in relation to the standard time-temperature curve and permitted deviation are shown in Appendix 3.

The percent deviation of the area under the average furnace time-temperature curve from the area under the standard time-temperature curve and permitted deviation, is shown in Appendix 3.

3.4.2 Pressure

The furnace pressure was controlled so that a pressure of 0 Pa was kept on level with 500 mm above the lower edge of the test specimen (the notional floor level).

The furnace pressure was controlled at the position 620 mm above the lower edge of the test specimen. Using a pressure gradient of 8.5 Pa/m the control pressure was calculated to be 1.02 Pa in order to establish a pressure of 0 Pa on level with 500 mm above the lower edge of the test specimen.

The calculated furnace pressure on level 500 mm above the lower edge of the test specimen (the notional floor level) and permitted deviation is shown in Appendix 3.

The equipment for pressure measurements fulfils the EGOLF agreement EA 03:2006. The measured pressure is presented in the graph as a moving average over a period of time one minute.

3.5 Ambient temperature

The ambient air temperature was measured with one thermocouple. The ambient air temperature during the test is shown in Appendix 3. The ambient air temperature at the beginning of the test was 17 °C.

3.6 Measurements on test specimen

During the test the properties needed for desired classification desires by the sponsor were measured and the behavior of the test specimen was evaluated during heat exposure.

3.6.1 Temperatures

The temperature rise on the unexposed side of the test specimen was not measured.

3.6.2 Heat radiation

The heat radiation from the test specimen during the test was not measured.

3.6.3 Deflection

The deflection of the test specimen during the test was measured with a laser meter.

The measuring points and the deflections of the test specimen during the test are shown in Appendix 4.

3.6.4 Measurements for extended field of application evaluations

No additional measurements for use at extended field of application were made.

3.6.5 Additional optional measurements

No additional optional measurements were made.

3.7 Observations

3.7.1 Photographs from the test

Photographs taken in connection with the test are shown in Appendix 4.

3.7.2 Observations during the test

Table: Observations

Time [min:s]	Observations (refer to the unexposed side if nothing else is stated)
00:00	The test starts.
03:44	Light smoke production at the connection between glass and door leaf at the lower right corner.
07:00	The lower left corner of door leaf bends out approx. 1 cm in relation to door frame.
07:58	Light smoke production to the right of the swing door operator.
09:49	The door leaf is discoloured in the upper left corner.
11:53	Fire exposed side: The swing arm is glowing slightly.
12:30	The upper half of the door leaf is discoloured.
16:20	Fire exposed side: A fluid is dripping from the swing door operator.
18:00	Fire exposed side: Protective sheet on the swing door operator starts to fall off.
19:23	Fire exposed side: Blue flames comes from the swing door operator.
20:50	Fire exposed side: Parts of the swing door operator falls off and hangs from wiring.
22:14	Plastic caps on swing door operator start to melt.
26:14	Plastic cap on right side on swing door operator falls off and lands on floor extension.
35:50	Fire exposed side: The swing door operator falls off and hangs from the swing arm.
37:14	Smoke production from plastic cap on left side on swing door operator.
46:30	Plastic drops down from right side of the swing door operator and lands on the lower part of the door leaf.
55:00	Door frame starts to glow to the right approx. 30 cm from the top and stretches approx. 100 cm down.
55:00	A small gap at upper left side between door frame and door leaf
59:45	Integrity test with 6 mm gap gauge is performed at a gap at upper left side between door frame and door leaf. The gap is not larger than 6 x 150 mm.
59:54-60:45	Integrity failure: Start and stop of a flame that continued for more than 10 seconds at the lower hinge.

Time [min:s]	Observations (refer to the unexposed side if nothing else is stated)
64:00	Integrity test with 6 mm gap gauge is performed at a gap at upper left side between door frame and door leaf. The gap is not larger than 6 x 150 mm.
67:50	Integrity test with 6 mm gap gauge is performed at a gap at upper left side between door frame and door leaf. The gap is not larger than 6 x 150 mm.
68:00	The test terminates on request of the sponsor.

• Integrity tests with cotton wool pads were not performed during the test since no leakage of hot gasses were observed.

3.8 Post-test measurements and observations

After the test following tests, measurements, evaluations and observations were made.

3.8.1 Observations after the test

Unexposed side

The swing door operator is still in place. Plastic cap on left side have melted and are charred. The door frame and leaf is discoloured from the heat exposure. Glass and glazing bead is intact.

Fire exposed side

The steel mounting plate is attached to the door frame. The swing door operator is hanging down by the swing arm. The door frame and leaf is heavily discoloured from the heat exposure. Glass and glazing bead is intact.

4 Summary

The test specimen, a glazed single leaf hinged door of steel with frame of steel with swing door operator, described under chapter 2, has been tested according to the accredited test methods:

- EN 1634-1:2014
- EN 1363-1:2012

Below is a summary of the results obtained during the test and essential information about the test specimen.

4.1 Fire test

The test lasted for 68 minutes.

The test specimen was tested with door leaf away from the furnace.

For information regarding the validity of the result in different directions see chapter "Number of test specimens and test direction".

Table: Summary integrity measurements

Integrity	Result
• Sustained flaming exceeding 10 seconds	60 minutes
• Gap gauges diameter 6 mm and 25 mm	68 minutes, no failure*
• Cotton wool pad test	68 minutes, no failure*

**The test has been discontinued before failure, at the request of the sponsor.*

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

5 Field of direct application of test results

The direct application of the test results to constructions similar to the construction described in this report is described in EN 1634-1 in chapter 13.

RISE Research Institutes of Sweden AB Safety - Fire Research, Fire Resistance

Performed by

Examined by

Mikael Ragneheim

Patrik Johansson

Appendices

Table: Appendices

Appendix	Description	Page
1	Drawings and specifications from the sponsor	1-25
2	Test setup	1
	Door clearances	2
3	Position of thermometers in the furnace	1
	Test conditions	2-6
4	Deflection	1
	Photographs from the test	2-3

Door system: SP 35000

Swing door operator: CDVI DIGIWAY SR

Glass: SGG Keralite, 5 mm.

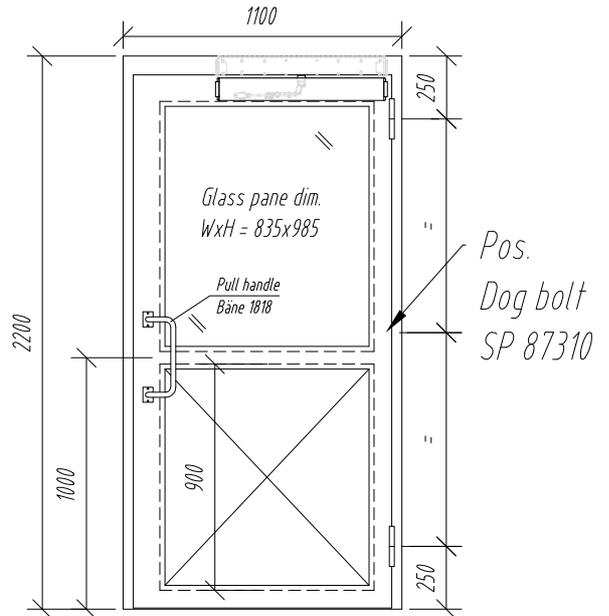
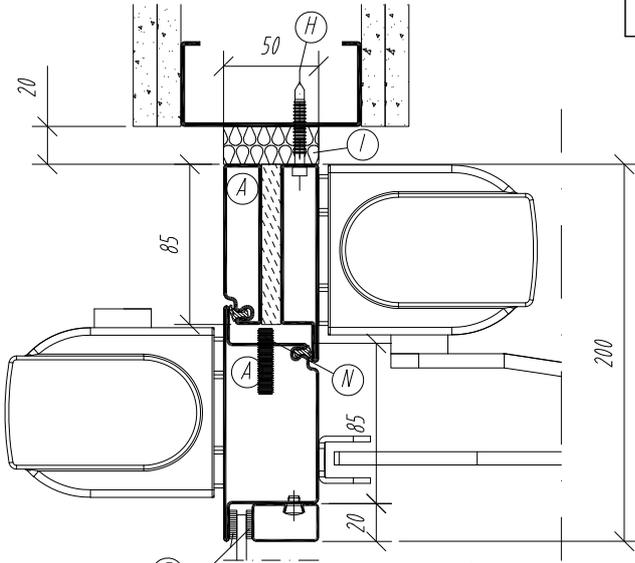
Panel: Steel metal sheet 1,5 mm + 2 pcs gypsum boards
12,5 mm + Steel metal sheet 1,5 mm

Test in standard flexible EI60 supporting wall
construction.

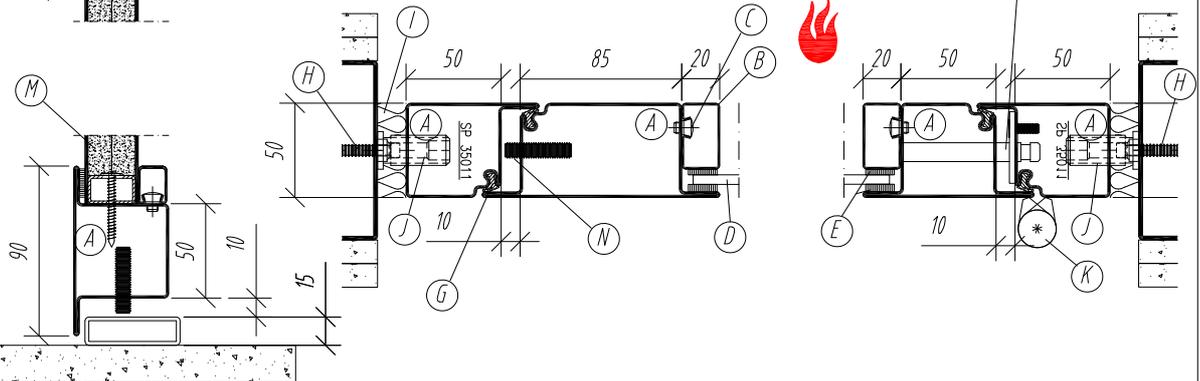
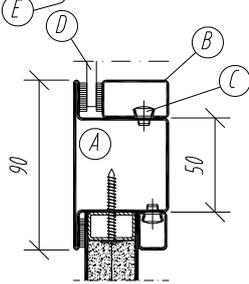
Opening in wall including non-combustible floor WxH =
1130 x 2220 mm.

Stålprofil Concept SP 300, system SP 35000 single door
Fire class E 60 acc. SS-EN 1634-1

Pos	Name	Material	Note
A	Stålprofil system SP 35000	Steel thickness 1,5 mm	-
B	Glazing beads SP 40000	Sendzimir galvanized t=1,25 mm	SP 43520/SP 41520
C	Bead screw SP 40020	Steel Ø4,8 L= 12,5 mm	-
D	Glass	Keralite 5 mm	-
E	Glazing tape	Kerafix 15x3-5	-
G	Door sealing SP 40035/2	Silicone	-
H	Fixation	Hilti Concrete screw 7,5x96	-
I	Insulation	Wool, FPY 1.	-
J	Adjustable frame screw	SP 40016	-
K	Welding hinges SP 82015013	Steel	2 pcs/door leaf
L	Threshold 50x15x2	Steel	-
M	Door filling	Steel plate and Gypsum board	Drawing 4-5742
N	Limiter Door gap	Set screw M8x25	3-4650
O	Dog bolt SP 87310	Ø10 mm, Stainless steel	4-5990

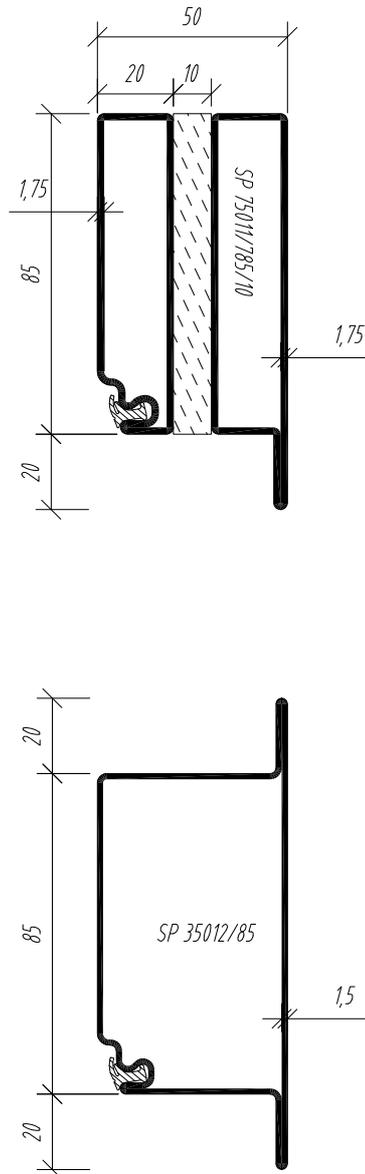
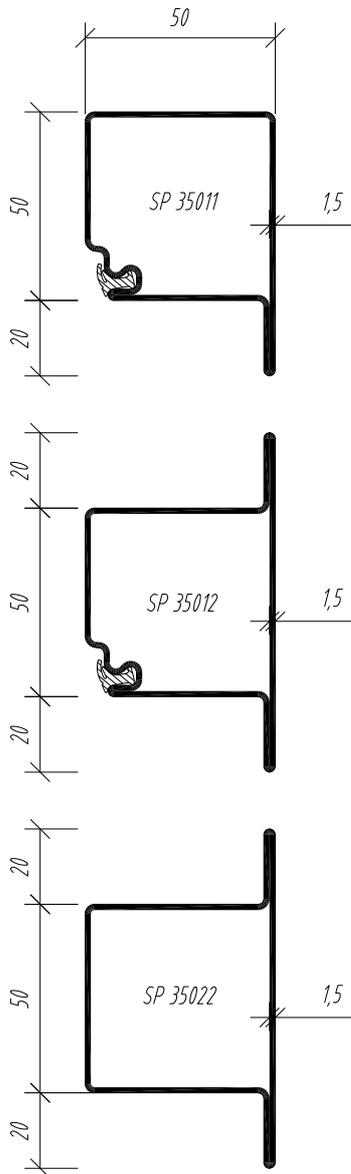


REF: 7P08049
APP: 1 (25 Pages)
RISE



Rev B Hinges and dog bolt 171207 JA
Rev A General revision 171204 JA

Stålprofilssystem SP 35000	SP Concept SP 300	Date 171005	SCALE -
Drawn by JA	Designer JA	Class E30 / E60	SP 300 Single door
SP test no T17-012	Project CDVI Firetest	DWG NO 4-5869	



Stålprofilssystem SP 35000	SP Concept SP 300	Date 171204	SCALE 1:2
Drawn by JA	Class E 60		
Designer -	Profiles		
SP test no T17-012			
Project CDVI	DWG NO 4-5918		REV
			



Glazing bead
SP 43520



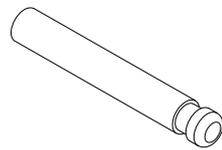
Glazing bead
SP 41520



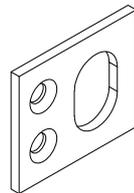
Bead screw
SP 40020



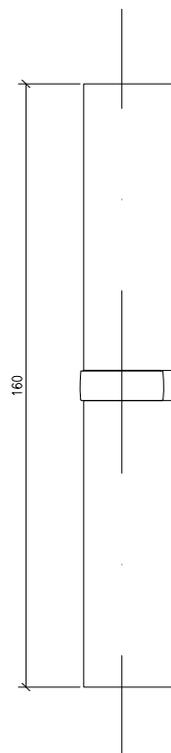
Door sealing
SP 40035-2



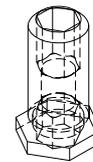
Dog bolt
SP 987310-M



Strike dogbolt
SP 987310-F

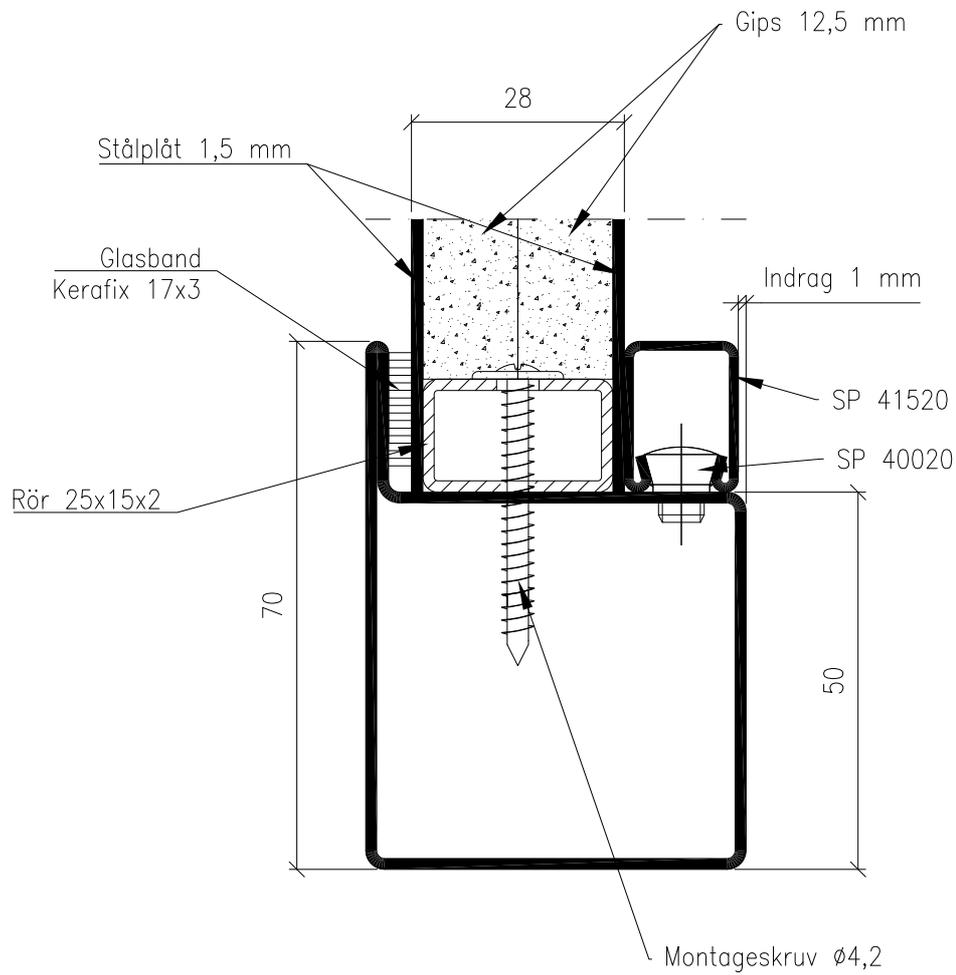


Weld on hinges
SP 8CLSBB160



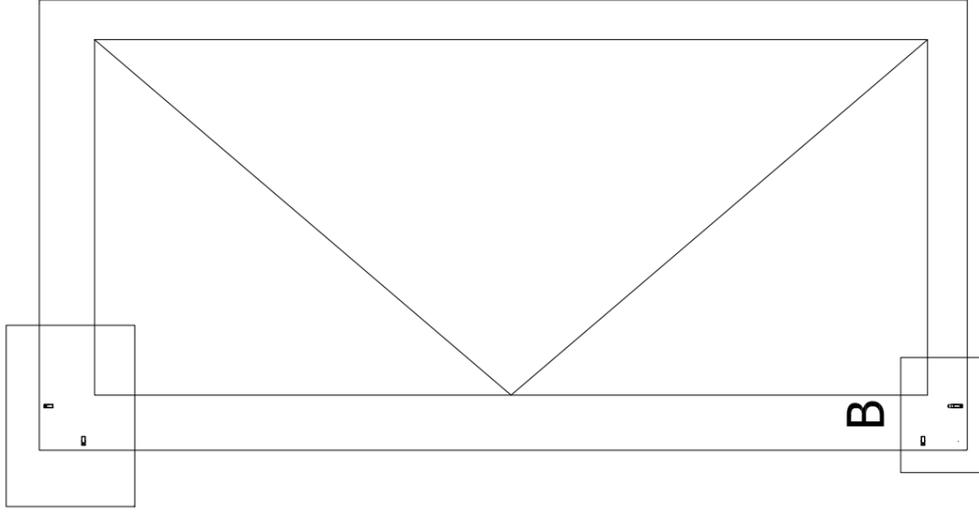
Adjustable Frame
fixation sleeve
SP 40016

Stålprofilsystem SP 35000	SP Concept SP 300	Date 171204	SCALE 1:2
Drawn by JA	Designer -	Class E 60	
SP test no T17-012	Project CDVI	Accessories	

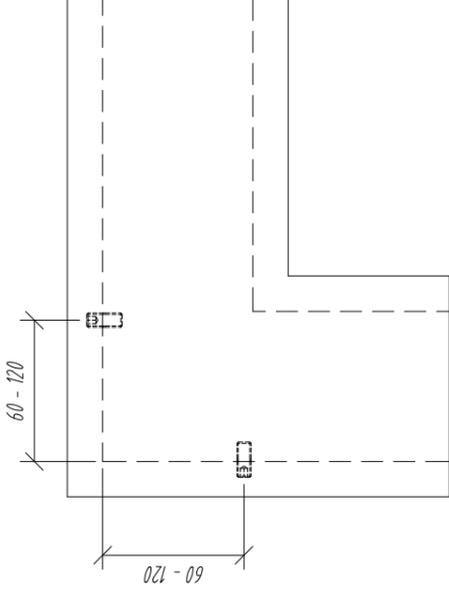


Ritad av JA	Kontr. -	Datum 161124	Skala -	Rit.Nr. 4-5742
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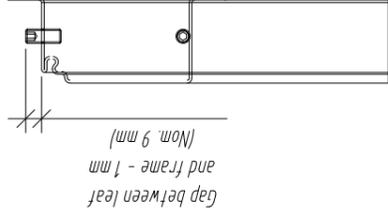
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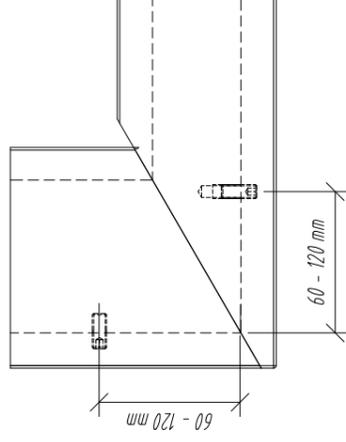
Door leaf



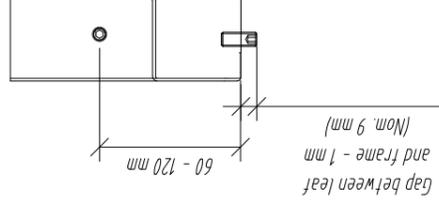
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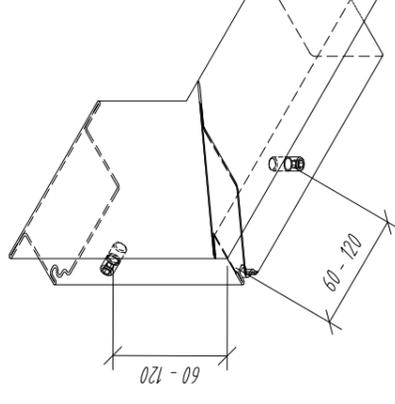
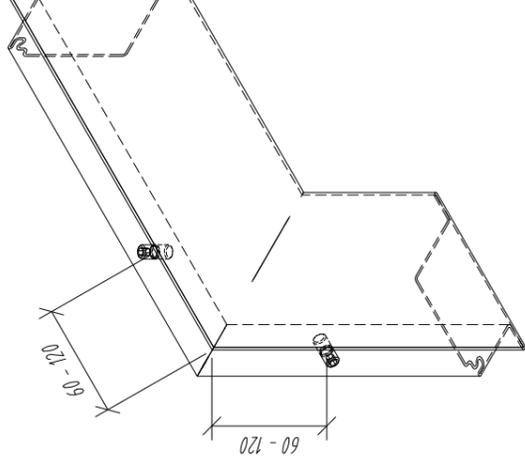
Gap between leaf
and frame - 1 mm
(Nom. 9 mm)



B (1:4)



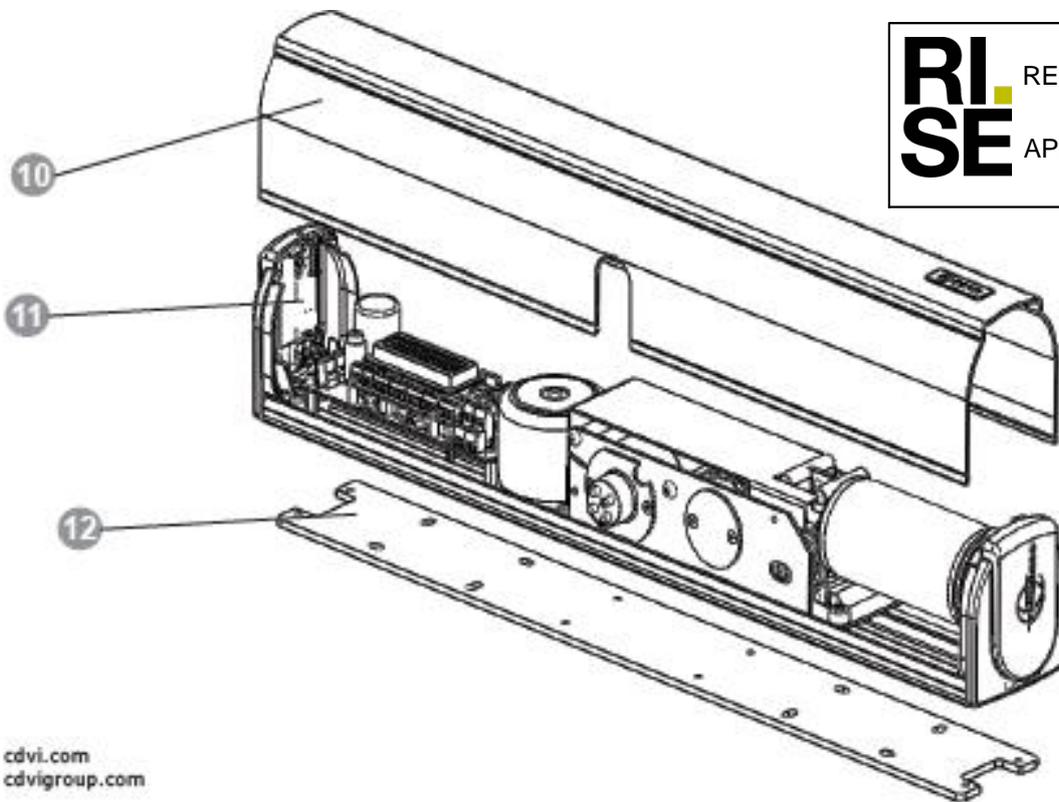
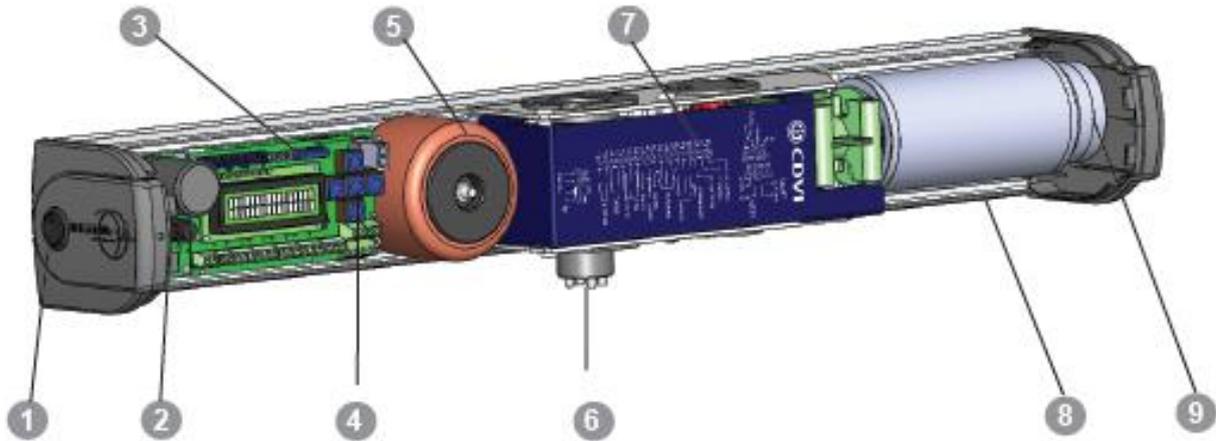
Gap between leaf
and frame - 1 mm
(Nom. 9 mm)



RISE REF: 7P08049
APP: 1 (25 Pages)

Stålpofilsystem SP 35000	SP Concept SP 300	Date 171205	SCALE -
Drawn by JA		Class E60	
Designer JA			
SP test n0 T17-012			
Project CDVI			
STÅLPROFIL		Limiter Assembly instructions - Deflection limiter	
		DWG NO 3-4650	REV

3.0 System components



RISE REF: 7P08049
 APP: 1 (25 Pages)

cdvi.com
 cdvigroup.com

- 1 – Operating mode selector
- 2 – Status LP led
- 3 – Display LCD
- 4 – 5-button keyboard
- 5 – Toroidal transformer (not used on types DWSR104XXX)
- 6 – motor shaft
- 7 – Mechanical drive with spring return
- 8 - slot for cover opening
- 9 – shaft encoder
- 10 - anodized aluminium cover
- 11 – radio receiver card
- 12 - backplate

3.1 Types

The unit Digiway-SR is manufactured in different versions according to the following table:

Single door operators – 230 Vac – 50 Hz

P/N	Reference	Description
F0543000163	DWSR102SCD	Swing door automation spring-return 230 Vac – Sliding arm
F0543000164	DWSR102ACD	Swing door automation spring-return 230 Vac – Articulated arm
F0543000165	DWSR102UCD	Swing door automation spring-return 230 Vac – Universal arm

Single door operators 18 Vac – 24 Vdc 50 – 60 Hz

P/N	Reference	Description
F0543000168	DWSR104SCD	Swing door automation spring-return 24 Vdc – Sliding arm
F0543000167	DWSR104ACD	Swing door automation spring-return 24 Vdc – Articulated arm
F0543000169	DWSR104UCD	Swing door automation spring-return 24 Vdc – Universal arm

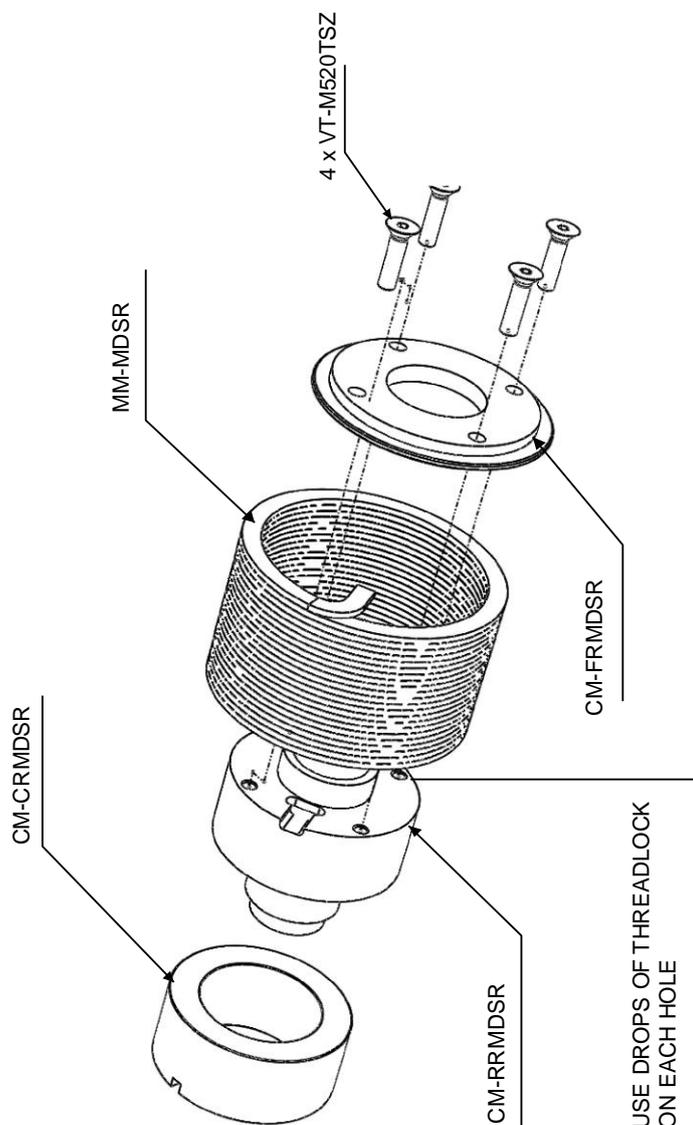
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4.0 Mechanic part assembling

4.1 Main Block with spring assembling

4.1.1 Spring support block

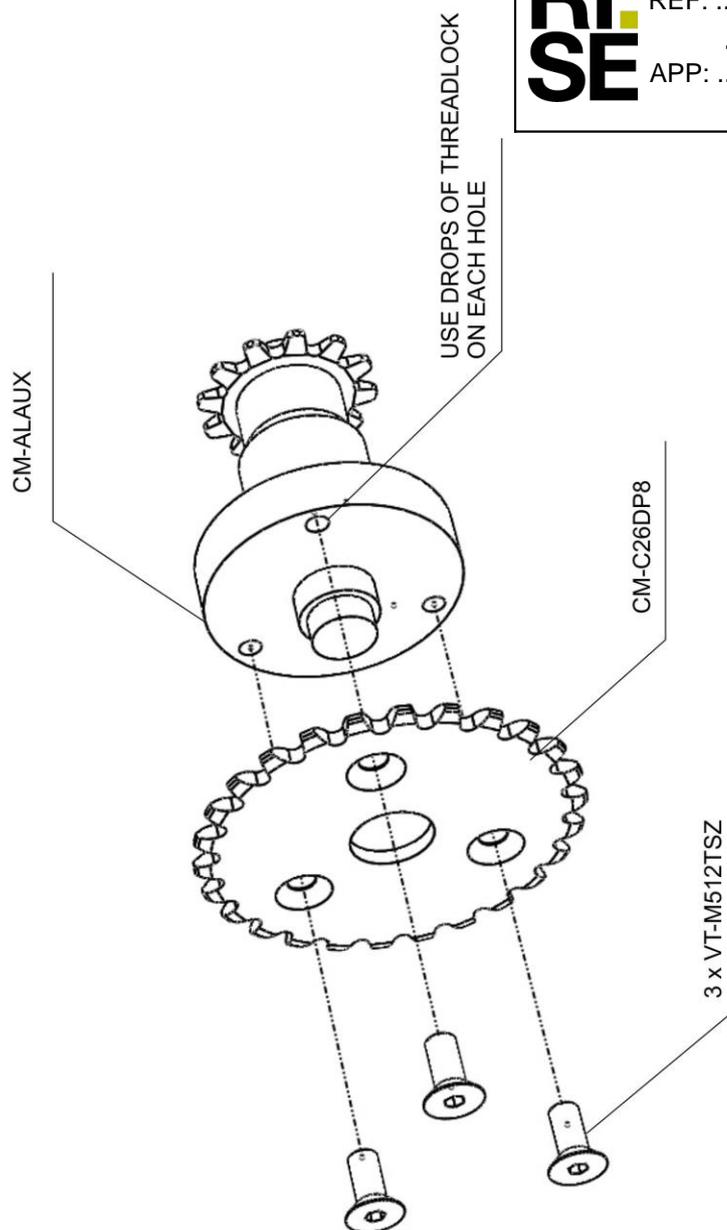
RISE	REF: 7P08049
	APP: 1 (25 Pages)



Q.ty	P/N	Description
1	CM-CRMDSR	CILINDRO REGGIMOLLA DIGIWAY-SR disegno 14-030 Ver. 2 del 03/11/2015
1	CM-RRMDSR	ROCCHETTO REGGIMOLLA DIGIWAY-SR disegno 14-013 Ver. 08 29/07/2015
1	MM-MDSR	MOLLA DIGIWAY-SR disegno 14-018 Ver.02 30/07/14
1	MM-FRMDSR	FLANGIA REGGIMOLLA DIGIWAY-SR disegno 14-003 Ver. 02 20/05/15
4	VT-M520TSZ	VITE ISO M5x20 TESTA SVASATA CAVA ESAGONALE ZINCATA UNI 5933

4.1.2 Auxiliary shaft

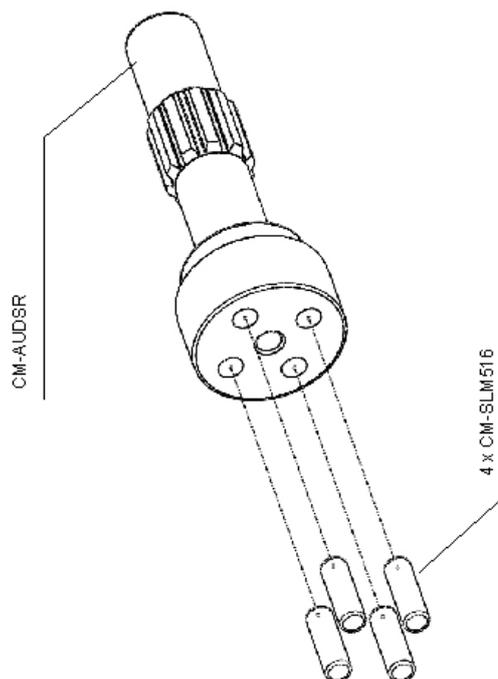
RI SE	REF: 7P08049
	APP: 1 (25 Pages)



Q.ty	P/N	Description
3	VT-M512TSZ	VITE ISO M5x12 TESTA SVASATA CAVA ESAGONALE ZINCATA UNI 5933
1	CM-C26DP8	CORONA 26 DENTI PASSO 8 disegno 14-010 Ver. 03 03/11/2015
1	CM-ALAUX	ALBERO AUSILIARIO disegno 14-030 Ver. 1 del 18/5/15

4.1.3 Main shaft pins mounting

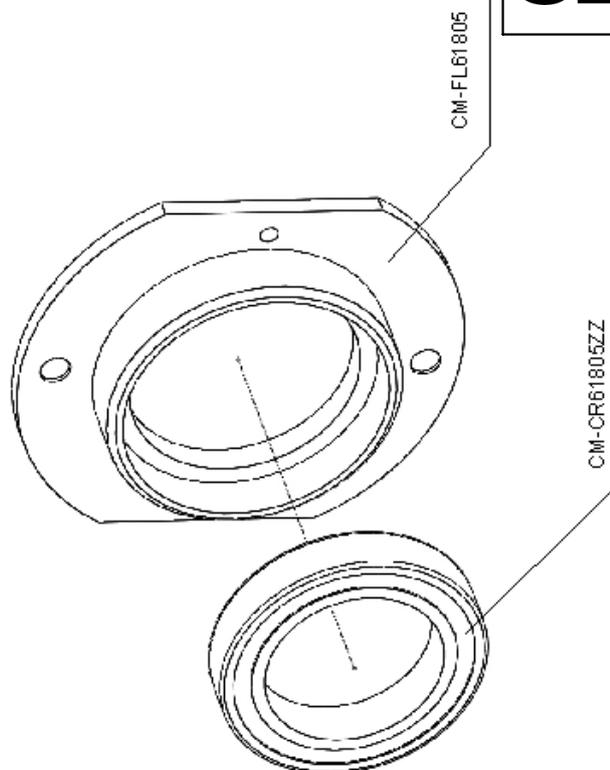
RI SE	REF: 7P08049
	APP: 1 (25 Pages)



Q.ty	P/N	Description
4	CM-SLM516	SPINA LAPPATA M5X16 UNI 6364-A
1	CM-AUDSR	ALBERO USCITA DIGIWAY-SR disegno 14-016 Ver.05 24/02/15

4.1.4 Ball bearing 61805 pre-mounting on corresponding flange

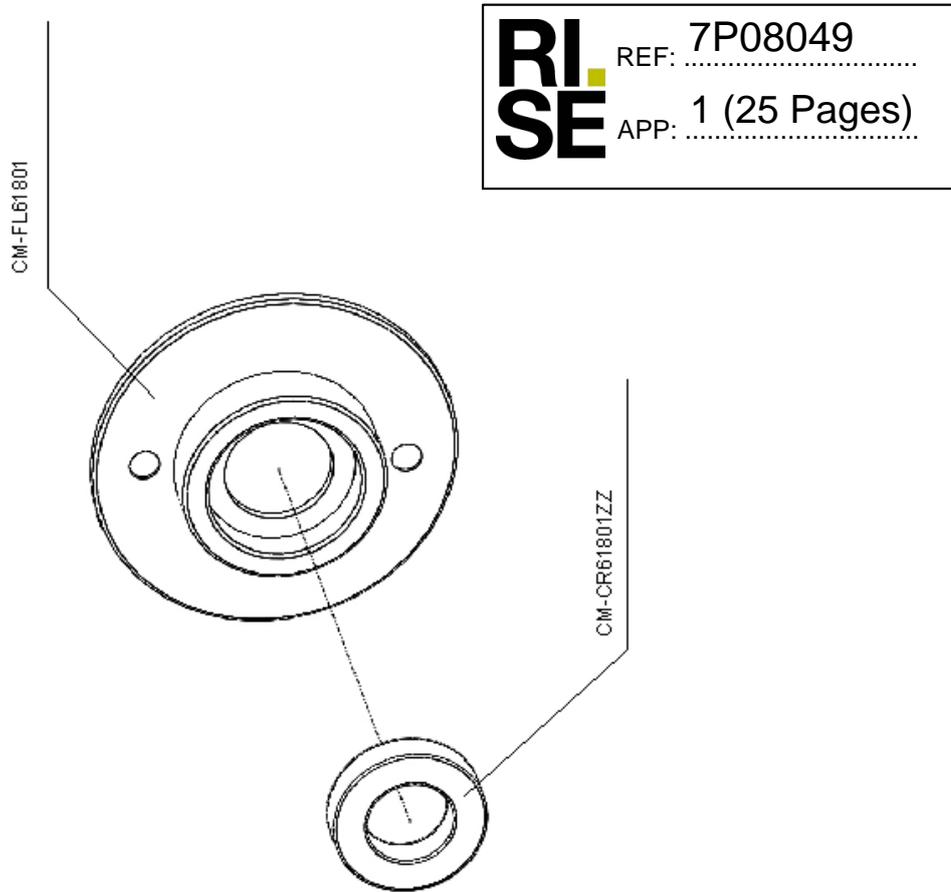
RI SE	REF: 7P08049
	APP: 1 (25 Pages)



Repeat for 2 pre-assemblies

Q.ty	P/N	Description
1	CM-CR61805ZZ	CUSCINETTO RADIALE 61805ZZ DOPPIO SCHERMO METAL.
1	CM-FL61805	FLANGIA CUSCINETTO 61805 disegno 14-019 Ver.04 del 03/11/2015

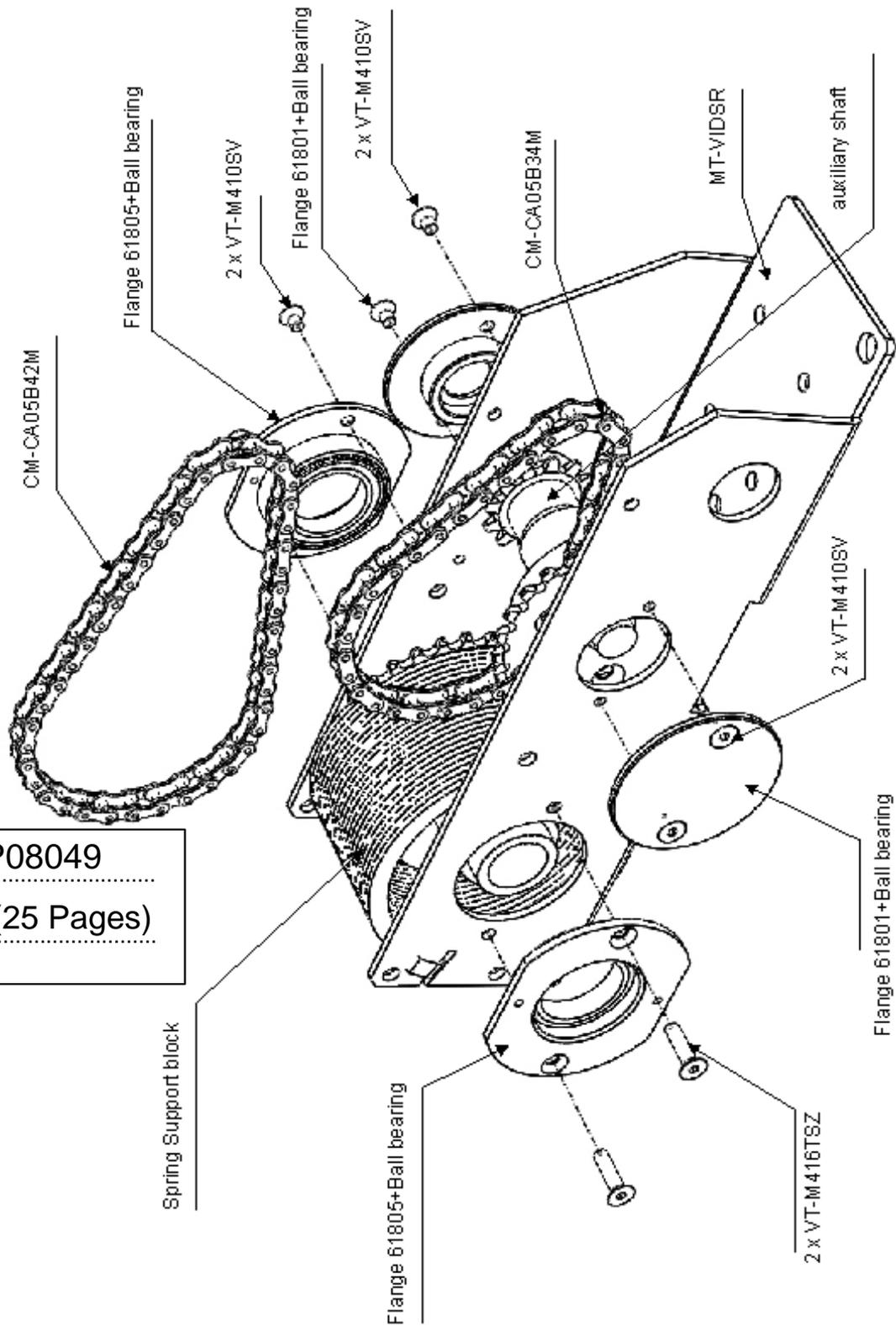
4.1.5 Ball bearing 61801 pre-mounting on corresponding flange



Repeat for 2 pre-assemblies

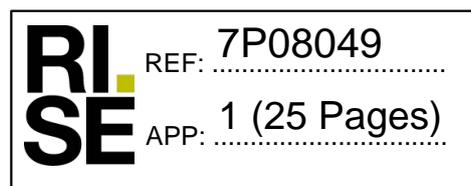
Q.ty	P/N	Description
1	CM-CR61801ZZ	CUSCINETTO RADIALE 61801ZZ DOPPIO SCHERMO METAL.
1	CM-FL61801	FLANGIA CUSCINETTO 61801 disegno 14-020 Ver. 04 del 15/12/2015

4.2 Main Gear Mounting



RISE REF: 7P08049
APP: 1 (25 Pages)

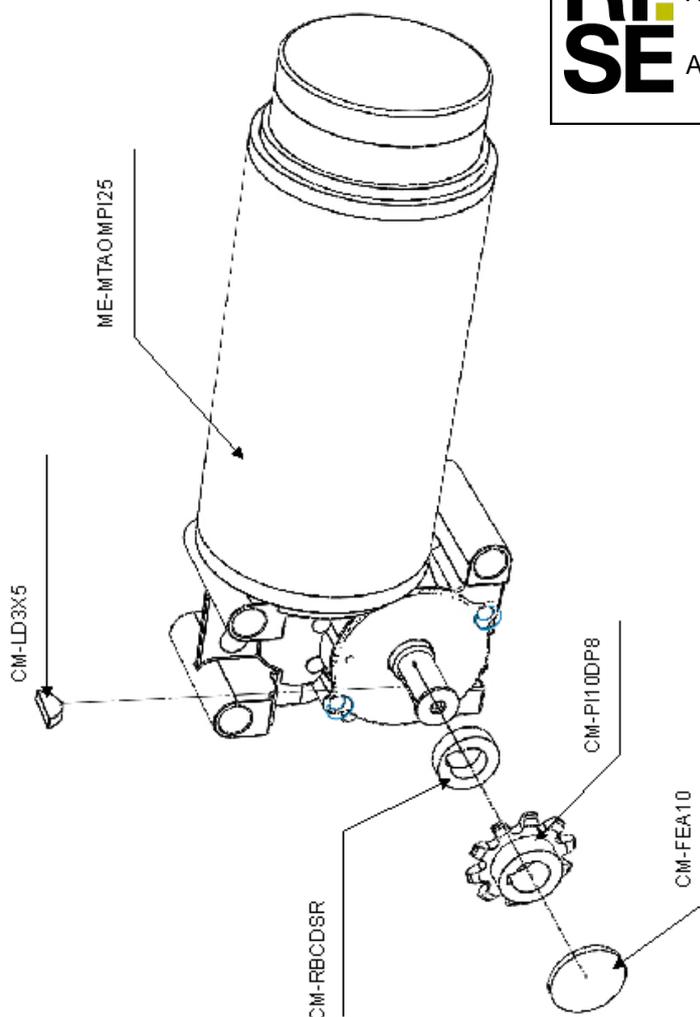
Q.ty	P/N	Description
1		Spring support block
2		Flange 61805 + ball bearing
2		Flange 60801 + ball bearing
2	VT-M416TSZ	VITE ISO M4x16 TESTA SVASATA CAVA ESAGONALE ZINCATA UNI 5933
6	VT-M410SV	VITE ISO M4x6 TESTA SVASATA CAVA ESAGONALE ZINCATA UNI 5933
1	CM-CA05B42M	CATENA PASSO 05B 42 MAGLIE
1	CM-CA05B34M	CATENA PASSO 05B 34 MAGLIE
1	MT-VIDSR	VASCA INOX MECCANISMO A MOLLA DIGIWAY-SR disegno 14-019 Ver.12 30/4/2015
1		Auxiliary shaft



4.3 Mounting of the pinion on the Gearmotor



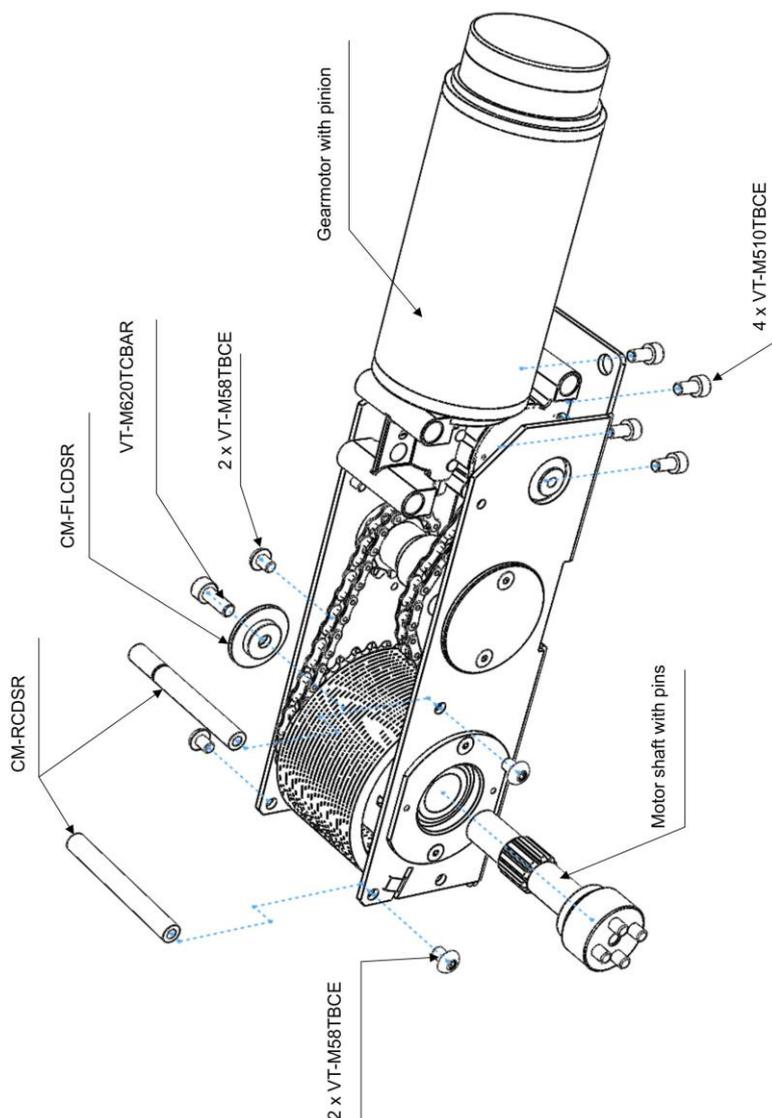
REF: 7P08049
 APP: 1 (25 Pages)



Q.ty	P/N	Description
1	CM-LD3X5	LINGUETTA A DISCO 3x5 UNI 6606
1	CM-PI10DP8	PIGNONE 10 DENTI PASSO 8 disegno 14-031 Ver.01 15/01/15
1	CM-RBCDSR	RONDELLA BLOCCA CHIAVETTA disegno 15/006 Ver. 1 del 03/11/2015
1	ME-MTAOMP125	MOTORID. AMER AOMP125 24V 190RPM
1	CM-FEA10	FLANGIA ELASTICA

4.4 Mounting the gearmotor on the support

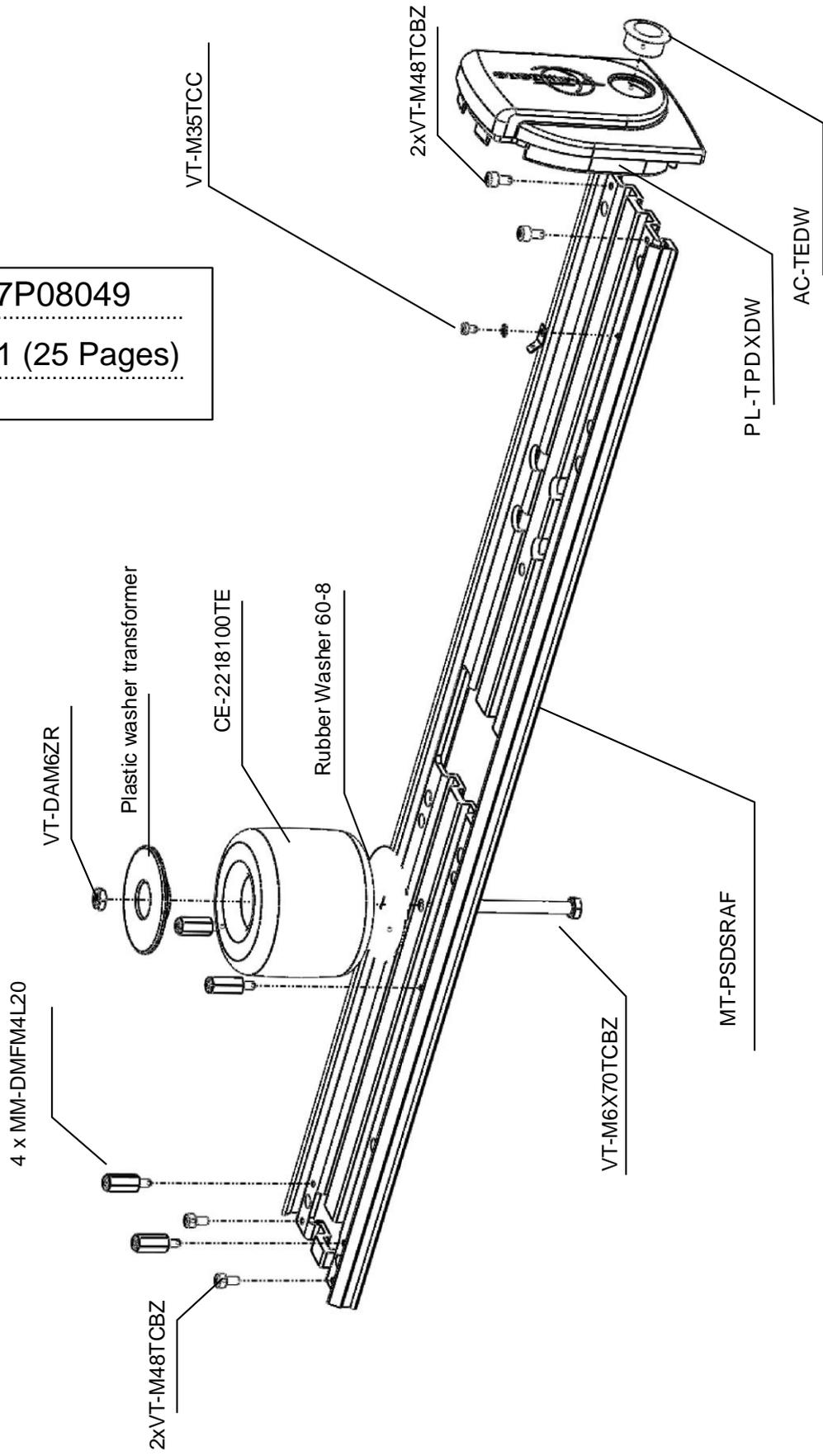
RISE	REF: 7P08049
	APP: 1 (25 Pages)



Q.ty	P/N	Description
1		Motor shaft with pins
2	CM-RCDSR	RACCORDO DISTANZIALE DIGIWAY-SR disegno 14-012 Ver. 01 15/01/15
4	VT-M58TBCE	VITE ISO M5x8 TESTA A BOTTONE CAVA ESAGONALE ISO 7380
1	CM-FLCDSR	FLANGIA DI CHIUSURA DIGIWAY-SR disegno 14-017 Ver. 02 03/11/2015
1	VT-M620TCBAR	VITE ISO M6x20 TESTA CILINDRICA BRUGOLA ALTA RESISTENZA
4	VT-M512TBCE	VITE ISO M5x12 TBCE ISO 7380

4.5 Preparing the Base profile

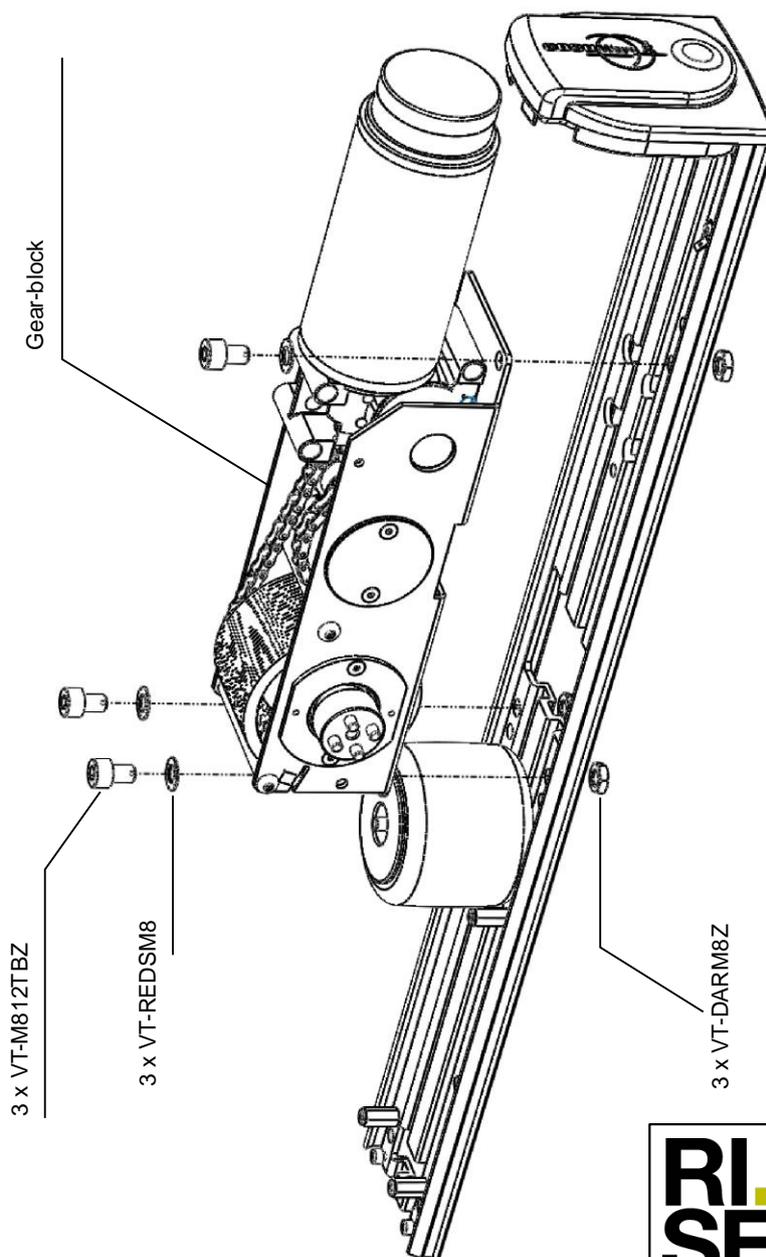
RISE REF: 7P08049
APP: 1 (25 Pages)



Q.ty	P/N	Description
4	VT-M48TCBZ	VITE ISO M4x8 TC BRUG ZINC UNI 5931
4	MM-DMFM4L20	DISTANZIATORE MET. M/F M4 L=20
1	VT-BTEM670Z	BULLONE TESTA ESAGONALE M6x70 ZINCATO UNI 24017
1	VT-DAM6ZR	DADO 6MA UNI EN 2432
1	CE-22218100TE	TRASFORMATORE 230/18V 100VA TOROID NF0022 C/3 DISCHI FISSAGGIO E CABLAGGIO
1	MT-PSDSRF	PROFILO SCHIENA DIGIWAY-SR ALLUMINIO FRESATO disegno 14-026 Ver.04 08/11/17
1	PL-TPDX	TAPPO DX DIGIWAY
1	AC-TEDW	TAPPO ESTERNO DIGIWAY



4.6 Mounting the mechanic part on the base profile

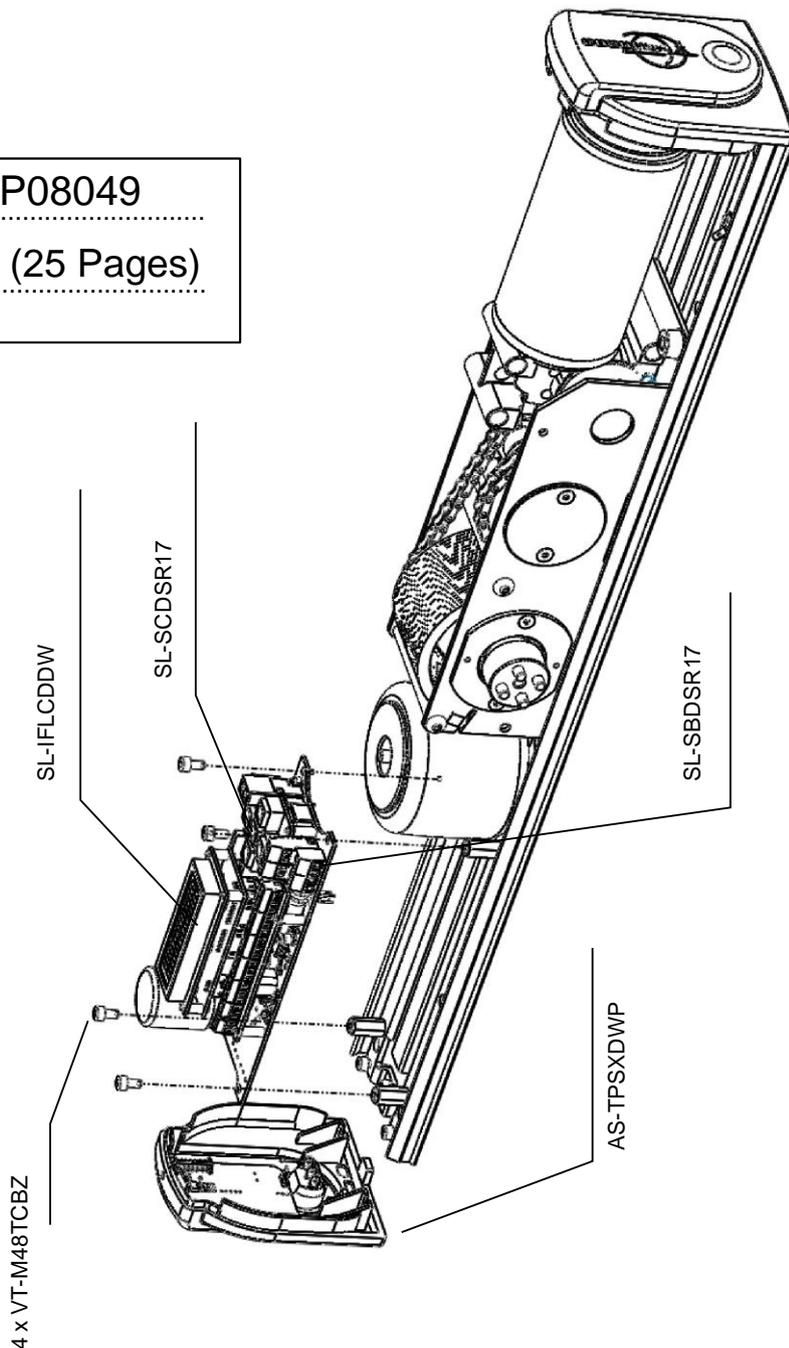


RI SE	REF: 7P08049
	APP: 1 (25 Pages)

Q.ty	P/N	Description
3	VT-M812TBZ	VITE ISO M8x12 TC BRUG ZINC UNI 5931
3	VT-REDSM8	ROSETTA ELA C/DENT M8x14 UNI 8842
3	VT-DARM8Z	DADO 8MA RIBASSATO ZINCATO UNI 24035

4.7 Electronic card mounting

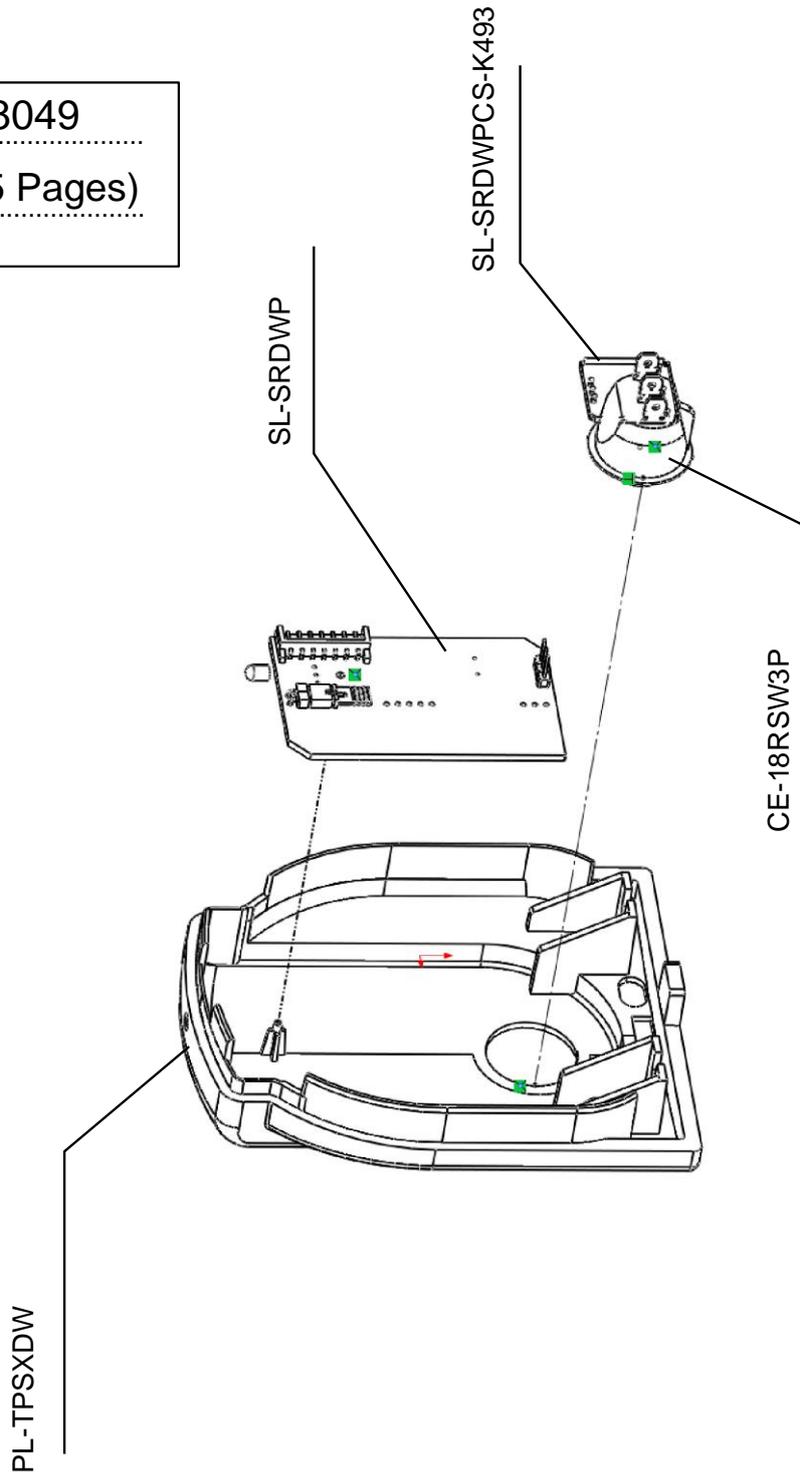
RI SE REF: 7P08049
 APP: 1 (25 Pages)



Q.ty	P/N	Description
4	VT-M48TCBZ	VITE ISO M4x8 TC BRUG ZINC UNI 5931
1	AS-TPSXDWP	ASSIEMATO TAPPO SX DIGIWAY PLUS
1	SL-IFLCDDW	SCHEDA I/F LCD DIGIWAY SPRING
1	SL-SBDSR17-K	SCHEDA BASE DIGIWAY-SR REV2017 C/KIT
1	SL-SCDSR17-K	SCHEDA CPU DIGIWAY-SR REV2017 C/KIT

4.8 Left cap mounting

RI SE	REF: 7P08049
	APP: 1 (25 Pages)

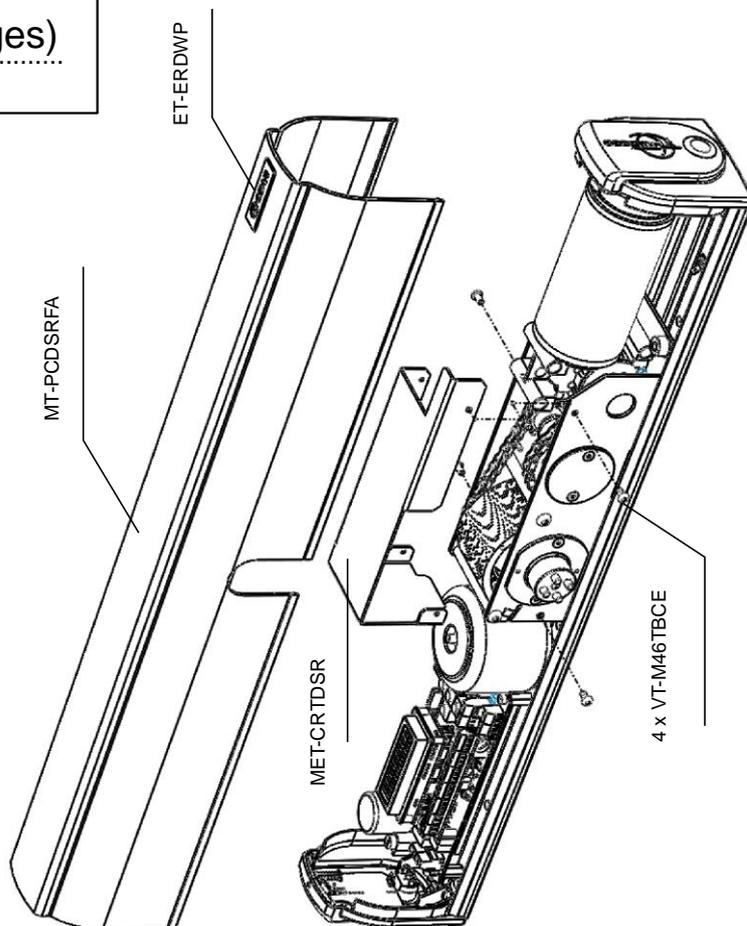


Q.ty	P/N	Description
1	PL-TPSXDW	TAPPO SX DIGIWAY
1	SL-SRDWP	SCHEDA RADIO DIGIWAY PLUS CON KIT
1	CE-18RSW3P	ROCKER SWITCH 3 POSIZIONI C/MARCATURA I-0-II
1	SL-SRDWPCS-K493	CIRCUITO STAMPATO K493 INTERF. CONN. TASTO RF DIGIWAY PLUS

4.9 Cover mounting

RI
SE

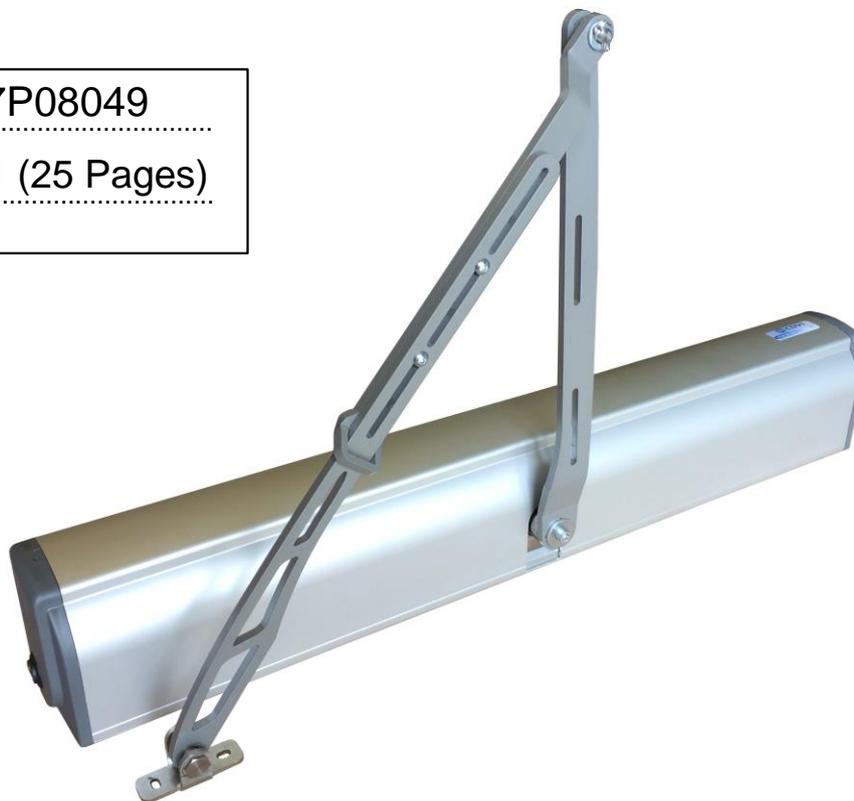
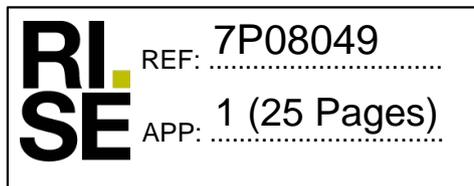
REF: 7P08049
 APP: 1 (25 Pages)



Q.ty	P/N	Description
1	MT-PCDSRFA	PROFILO COPERTURA DIGIWAY-SR FRESATO E ANODIZ. disegno 14-027 Ver.02 08/11/17
4	VT-M46TBCE	VITE ISO M4x6 TESTA A BOTTONE CAVA ESAGONALE ISO 7380 ZINC. BIANCO
1	MT-CRTDSR	CARTER DI COPERTURA DW-SR ALLUMINIO disegno 15-005 Ver. 2 7/04/15
1	ET-06DWSR	ETICHETTA POLICARBONATO CARTER DW-SR

12.0 Photos

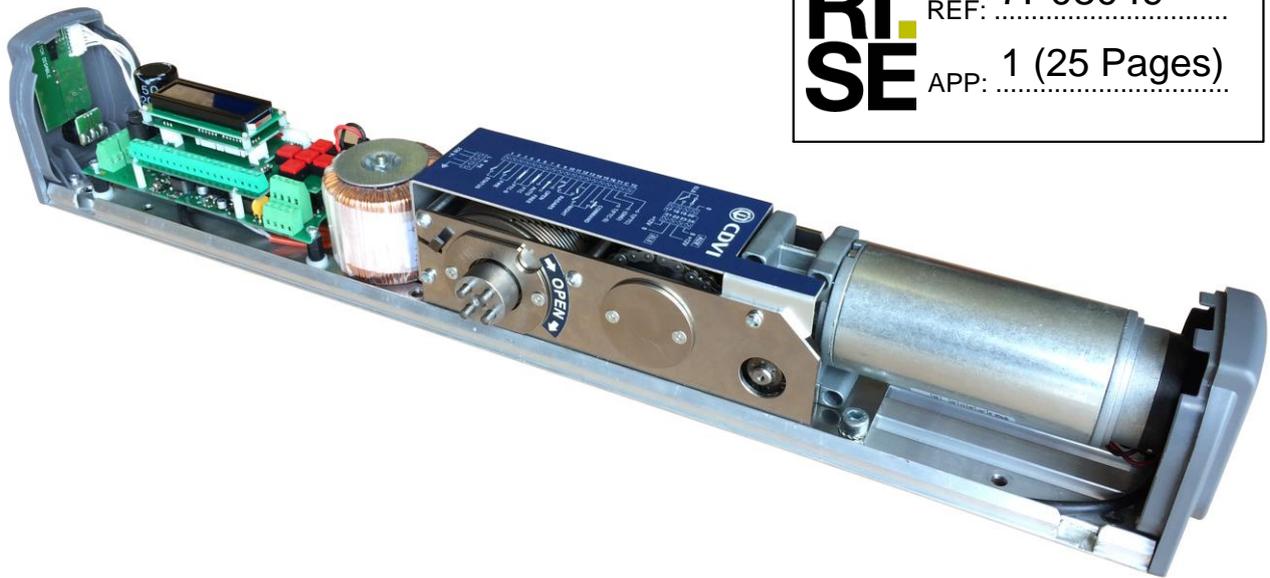
12.1 Unit with articulated arm



12.2 Unit with sliding arm

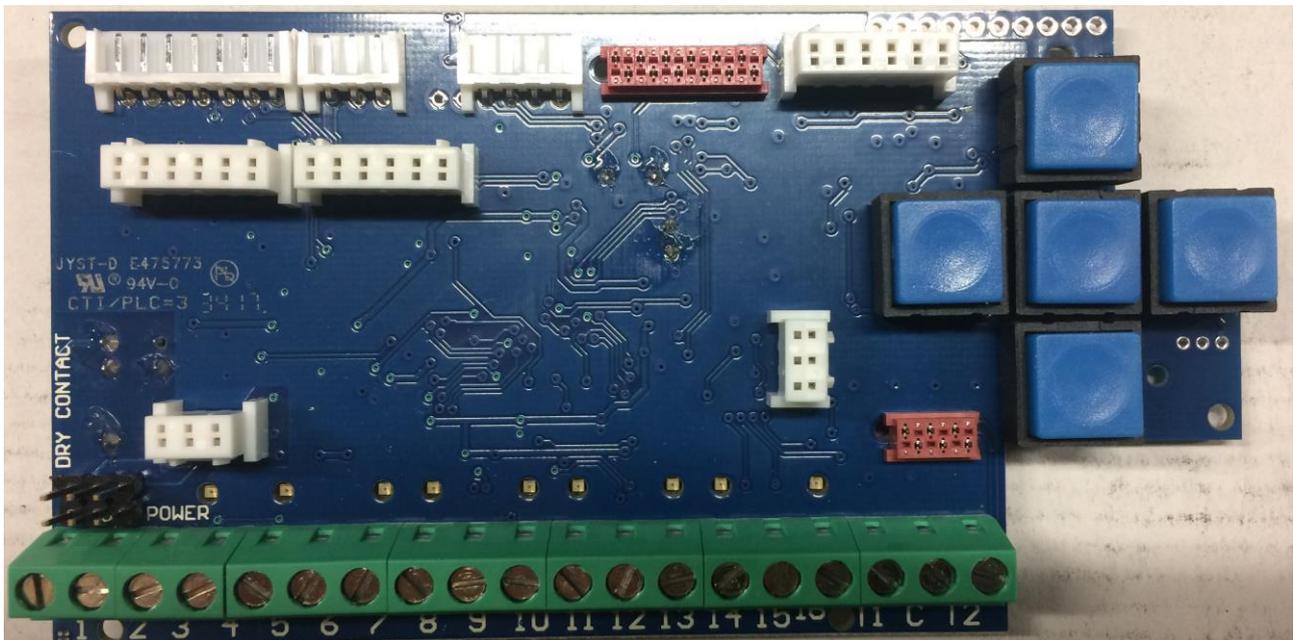


12.3 Full view



RI REF: 7P08049
SE APP: 1 (25 Pages)

12.4 CPU front

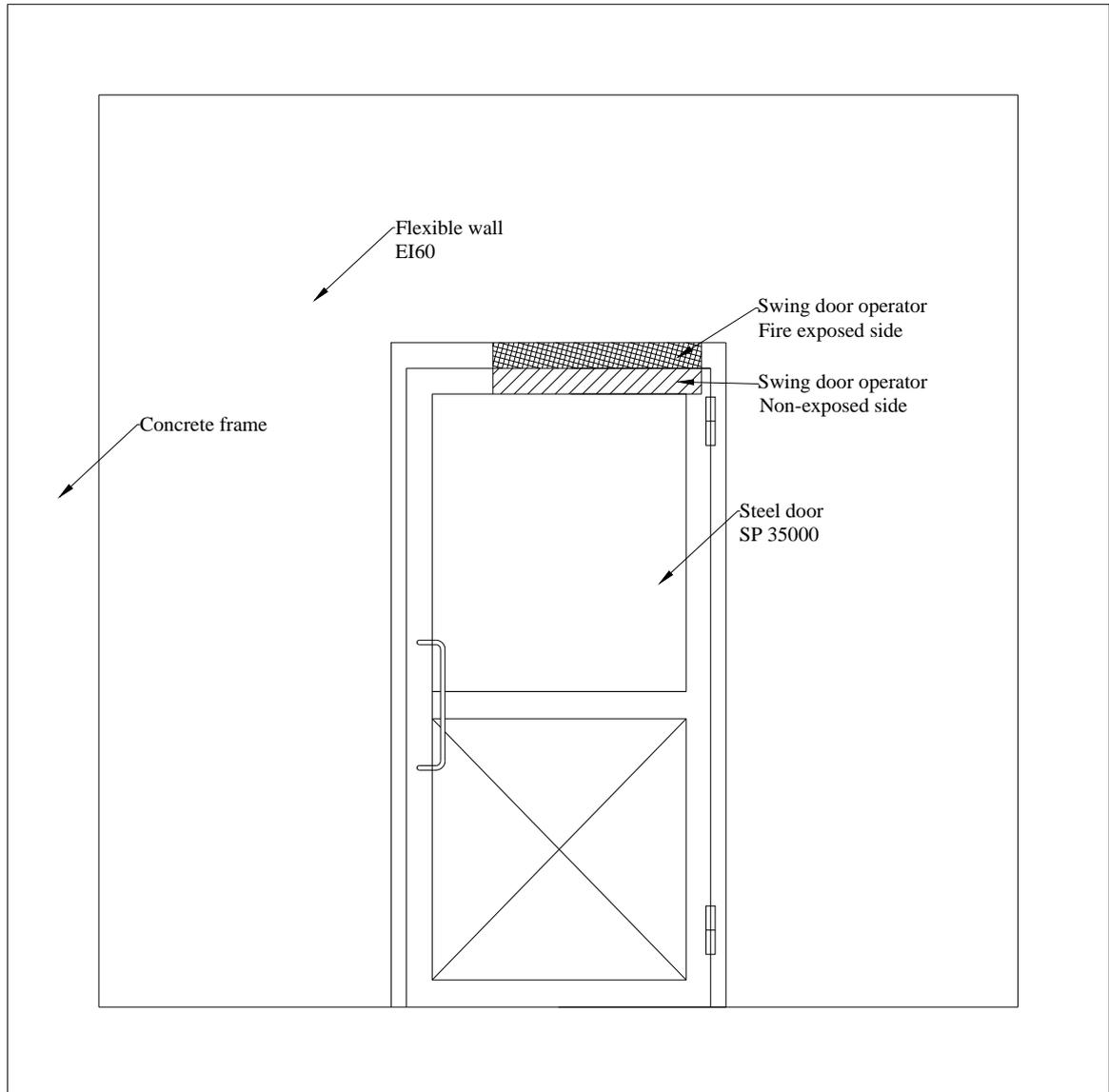


12.10 Full internal top view



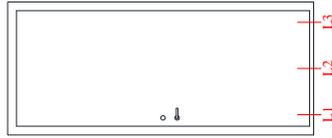
RI REF: 7P08049
SE APP: 1 (25 Pages)

Appendix 2

Test setup

Appendix 2

Door clearances



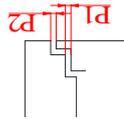
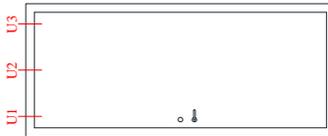
Gaps: Lower edge

	P1	P2
L1	8,0	
L2	8,1	
L3	8,1	

8,1		
-----	--	--

8,1		
-----	--	--

10,1		
------	--	--



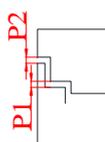
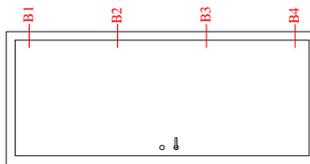
Gaps: Upper edge

	P1	P2
U1	12,9	4,5
U2	13,6	4,4
U3	12,3	4,4

13,6	4,5	
------	-----	--

12,9	4,4	
------	-----	--

15,3	6,5	
------	-----	--



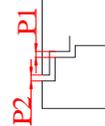
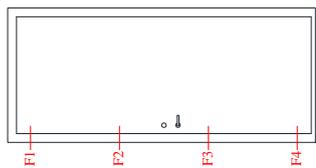
Gaps: Back edge

	P1	P2
B1	11,6	2,7
B2	10,8	2,3
B3	11,1	2,1
B4	11,0	2,7

11,6	2,7	
------	-----	--

11,1	2,5	
------	-----	--

13,4	4,6	
------	-----	--



Gaps: Front edge

	P1	P2
F1	8,8	1,4
F2	8,7	0,4
F3	9,4	1,0
F4	11,0	3,1

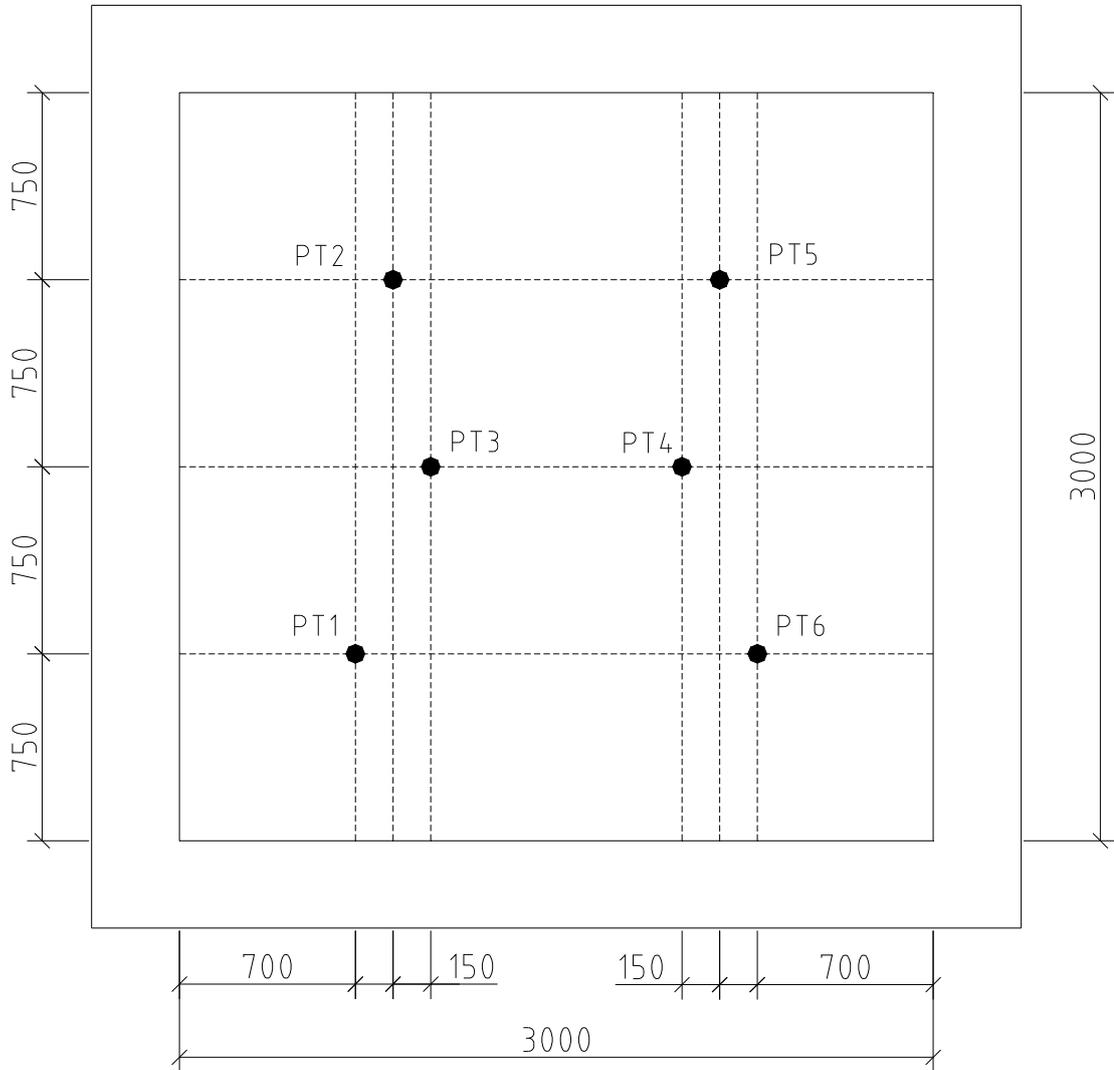
Maximum measured	11,0	3,1
------------------	------	-----

Mean measured	9,5	1,5
---------------	-----	-----

Max permitted	12,2	4,3
---------------	------	-----

Appendix 3

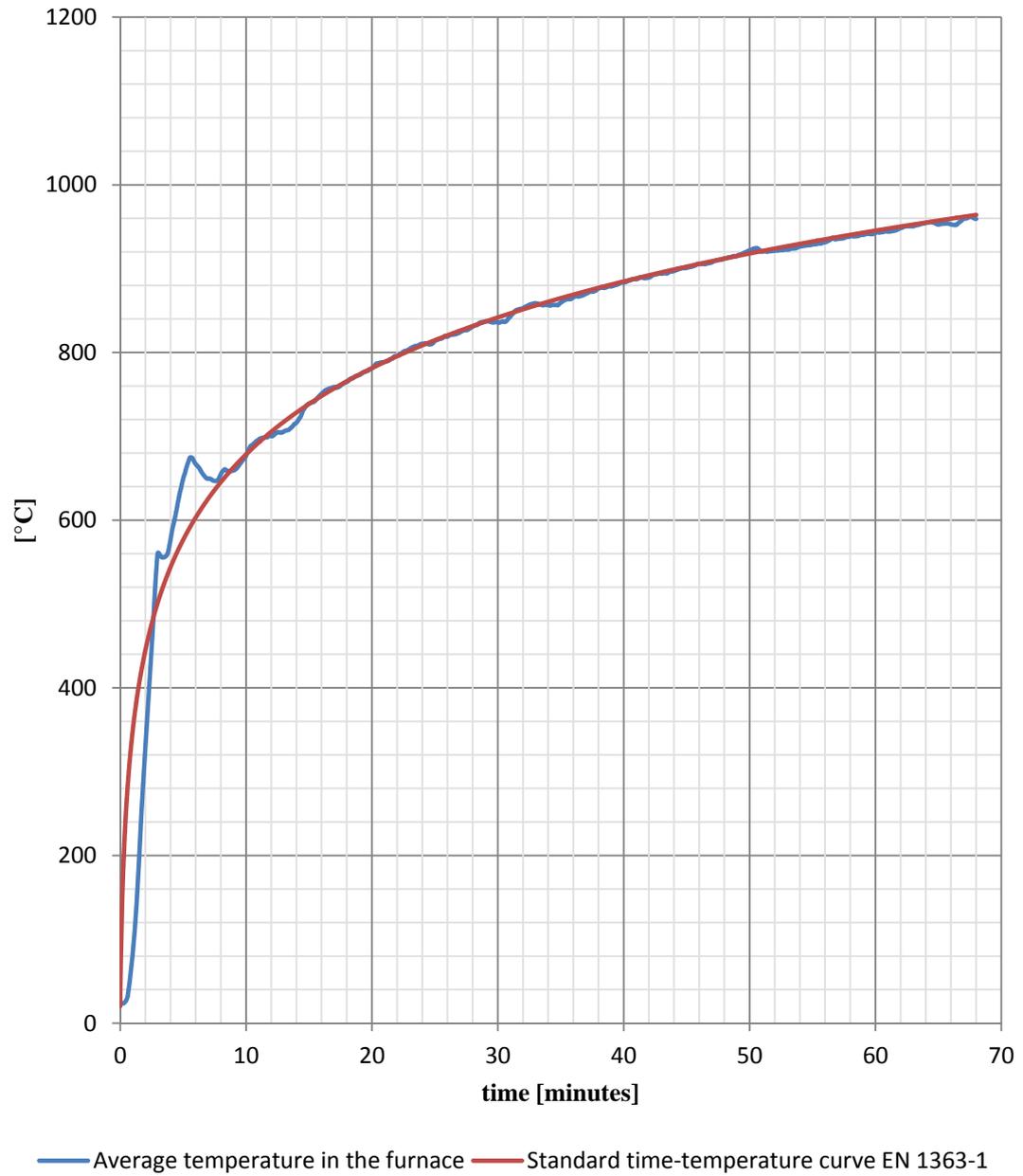
Position of thermometers in the furnace



● PT1-PT6: Termoelementens placering i ugn

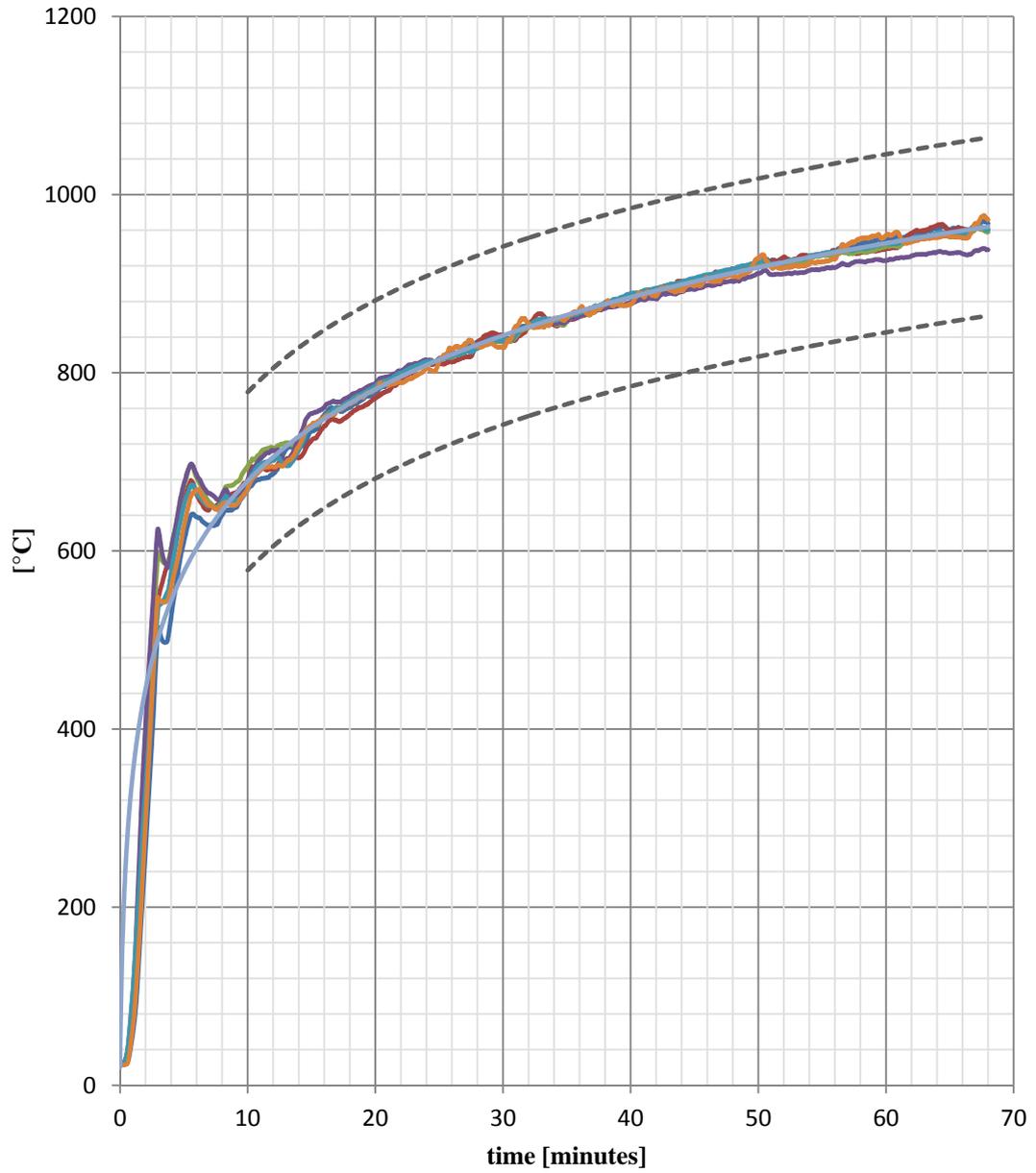
Appendix 3

Test condition: The average temperature in the furnace



Appendix 3

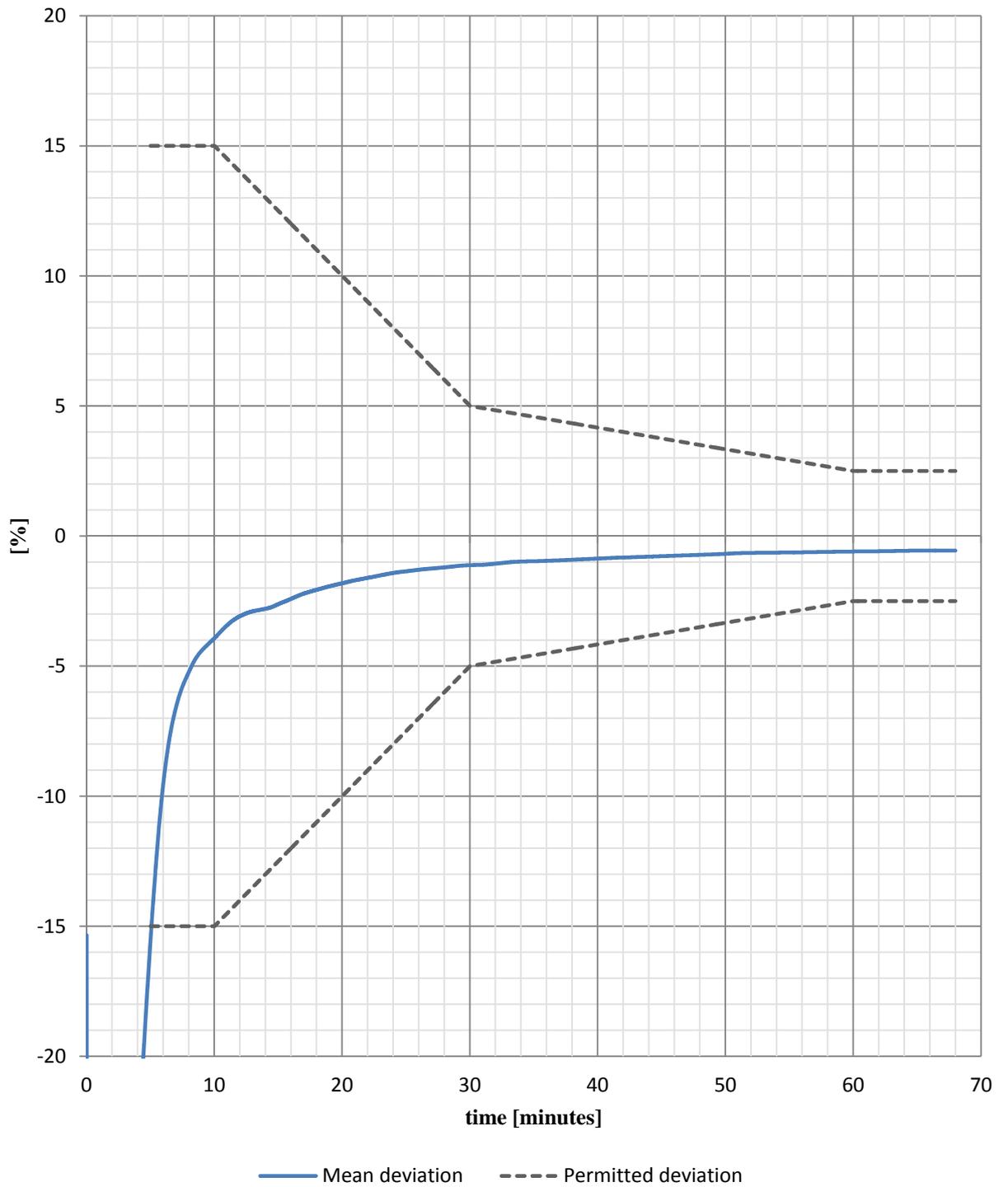
Test condition: The temperature at each thermometer



- PT1
- PT2
- PT3
- PT4
- PT5
- PT6
- Standard time-temperature curve EN 1363-1
- - - Permitted deviation

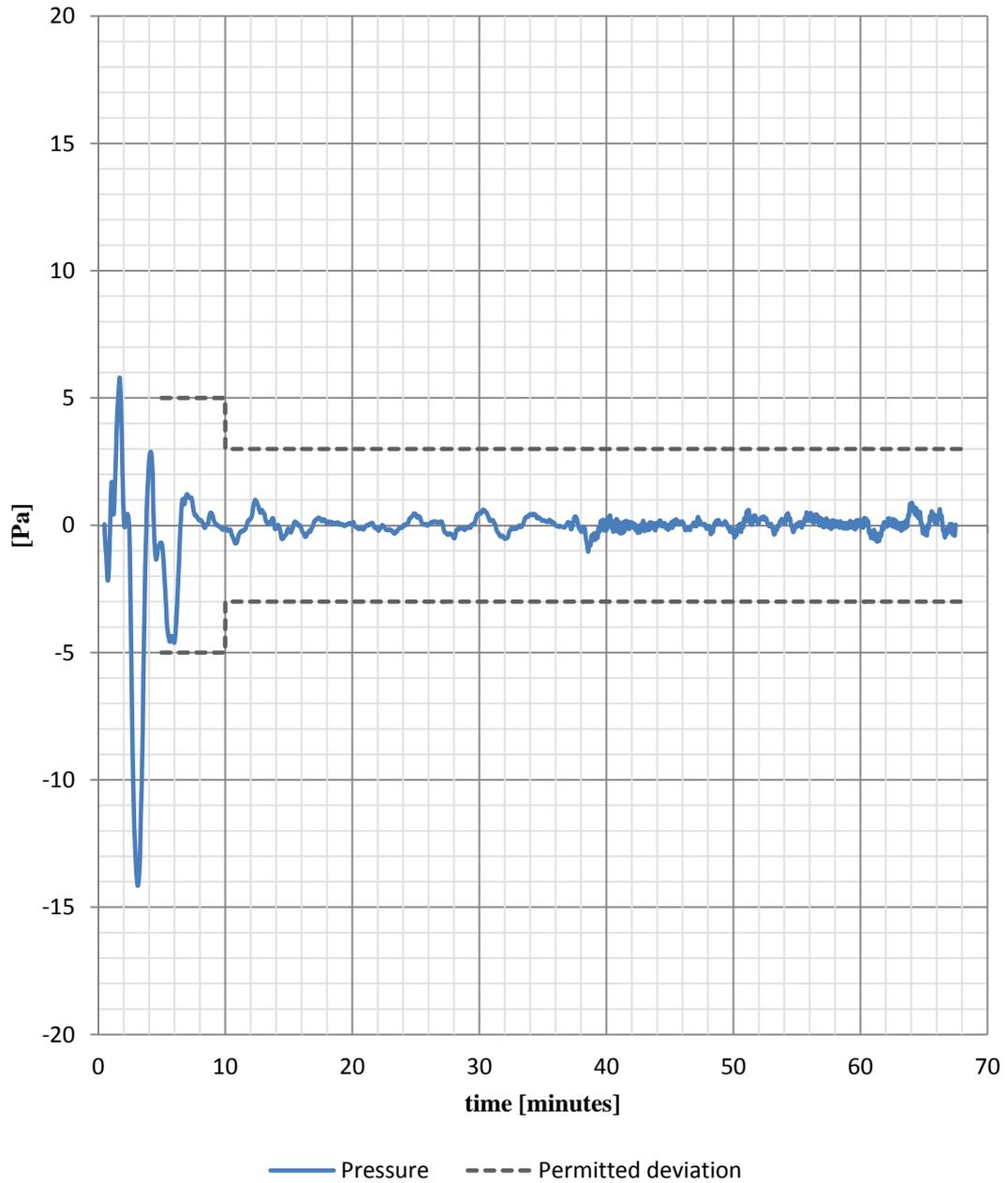
Appendix 3

Test condition: The percent deviation of the furnace time-temperature

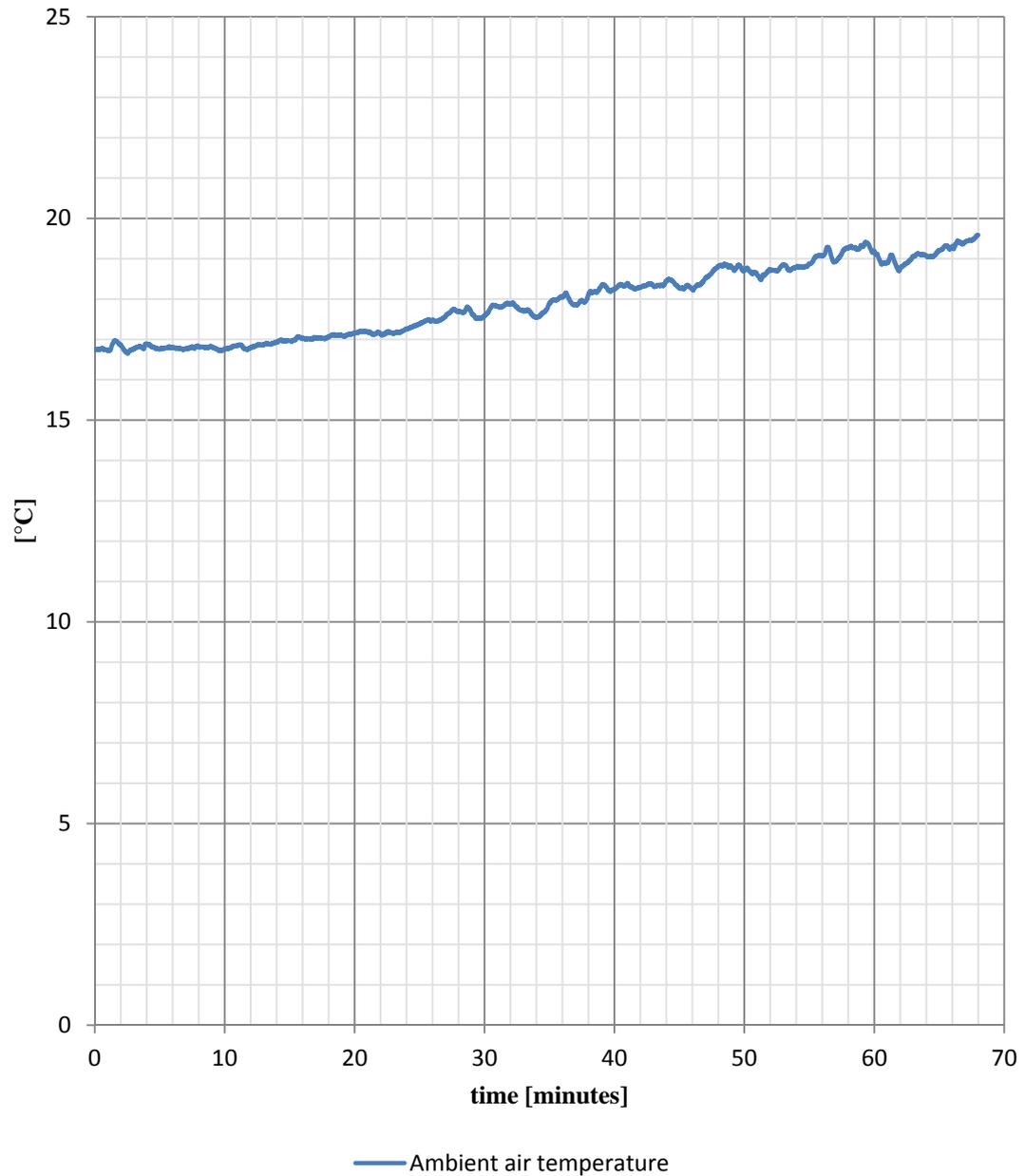


Appendix 3

Test condition: The calculated furnace pressure on the height of the demand

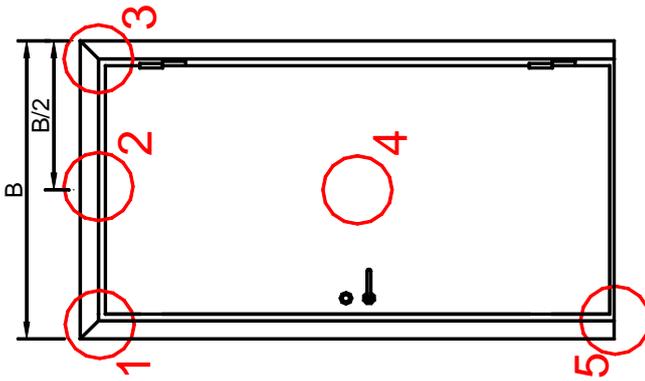


Appendix 3

**Test condition: The ambient air temperature
during the test**

Appendix 4

Deflection



Measured deflections (mm)

(Schematic drawing of the test specimen)

Positive value indicates deflection inwards the furnace.

Negative value indicates deflection outwards the furnace.

Explanations of the table below:

K = Door frame

DB= Door leaf

C = Centre of the door leaf

V = Wall

DB-V = Left door leaf on a double leaf door

DB-H = Right door leaf on a double leaf door

R = Smoke or other disruption of the sight

Pos. Time [min]	1			2			3			4			5		
	V	K	DB	V	K	DB	V	K	DB	C	V	K	DB		
0	0	0	0	0	0	0	0	0	0	0	0	0	0		
10	11	1	-1	8	13	20	14	15	15	34	1	-1	-10		
20	11	3	-1	12	14	21	15	21	20	35	1	0	-10		
30	14	8	4	17	21	24	21	25	27	R	2	0	-9		
40	24	21	19	34	34	39	33	40	41	R	3	1	-8		
50	36	35	23	54	50	53	59	64	64	R	2	2	-10		
55	44	45	14	61	65	49	67	72	62	R	2	0	-11		
60	58	58	29	69	73	62	78	84	79	R	2	0	-11		
65	59	61	32	71	77	66	80	84	82	R	2	0	-11		

Appendix 4

Photographs from the test



The test specimen at start of test.



The test specimen after 30 minutes.

Appendix 4

Photographs from the test

A close up of the swing door operator on the non-fire exposed side after the test.



The test specimen on the fire exposed side after the test.