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REPORT

on

Industrial Control Panels certified for Canada

TEKPAN - TEKNİK ELEKTRİK KUMANDA PANO SAN VE TURİZM TİCARET LTD STİ  
ULUCAK/ KEMALPASA, İZMİR, TURKEY

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## DESCRIPTION

## PRODUCT COVERED:

USL, CNL - Enclosures for Industrial Control Panels, Sheet metal enclosure Series TEOS and DM.

## GENERAL:

Series TEOS and DM metal enclosures, with single and double door, are intended for indoor use, to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree protection against falling dirt.

Series TEOS and DM metal enclosures, with single and double door, are intended for indoor use, primarily to provide a degree of protection against dust, falling dirt and dripping non-corrosive liquids.

**Series DM metal enclosures, with single door, are intended for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water and hose-directed water; and that will be undamaged by the external information of ice on the enclosure.**

**Series DM metal enclosures, made of stainless steel AISI 304 or 316 only with single door, intended for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water and corrosion; and that will be undamaged by the external information of ice on the enclosure.**

Series TEOS is suitable for Side-by-Side configuration.

## ENVIRONMENTAL RATING:

Enclosures Series	Door(s)	Type
TEOS	Single	1, 12
	Single with observation window	1, 12
	Double	1
DM	Single	1, 12, 4
	Single with observation window	1, 12, 4
	<b>Single (made of stainless steel)</b>	<b>1, 12, 4, 4X</b>
	<b>Single with observation window (made of stainless steel)</b>	<b>1, 12, 4, 4X</b>
	Double	1

## MAXIMUM ENCLOSURE SIZES

Enclosure Series	Height (mm)	Width (mm)	Depth (mm)	Door(s)
TEOS	2200	800	800	1
	2200	1200	600	2
DM	1150	800	280	1
	1200	1000	280	2

## TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Products designated USL have been investigated using requirements contained in United States Standards UL 508A, the Standard for Industrial Control Panels, 1<sup>st</sup> Edition.

Products designated CNL have been investigated using requirements contained in Canadian National Standards C22.2 No. 14, the Standard for Industrial Control Equipment, 11<sup>th</sup> Edition.

All models may be provided with a metal sub-panel, 2.5 mm minimum thickness. No back mounted components are allowed between sub-panel and the back sheet metal enclosure.

## MARKING:

Each enclosure shall be marked with the Listee's name, or trademark (if authorized on the Section General), and series designation. If the front is shipped separately from the body of the enclosure, then both the front and the body shall bear this marking.

If an enclosure is not shipped complete such as multi-door enclosure, the parts of the enclosure shall be marked with the following marking on each section, "Section \_\_ of \_\_, see instruction for interconnections" or equivalent wording, so that they can be readily assembled. An enclosure is intended to be constructed as described in this report.

An enclosure shall be marked with a type number, "Type 1 Enclosure", "Type 12 Enclosure", indicating the external conditions for which it is acceptable.

Type 1: Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.

Type 12: Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping non-corrosive liquids. The marking may be on the inside or outside surface but shall be visible after installation. Enclosures marked with a Type 12 may also be marked "driptight". An enclosure maintains the type number only if it is provided with all parts which maintain the environmental integrity. This enclosures marked "Type 12" includes both single and multi-doors enclosures.

**Type 4: Indoor or outdoor use to provide a degree of protection to personnel against falling dirt, rain, sleet, snow, windblow dust, splashing water and hose-directed water; and that will be undamaged by the external information of ice on the enclosure. Enclosures marked with a Type 4 may also be marked "Raintight" and "Watertight".**

**Type 4X (only for models made in stainless steel AISI 304 or 316): Indoor or outdoor use to provide a degree of protection to personnel against falling dirt, rain, sleet, snow, windblow dust, splashing water, hose-directed water and corrosion; and that will be undamaged by the external information of ice on the enclosure. Enclosures marked with a Type 4 may also be marked "Raintight" and "Watertight".**

## MARKING (CONT'D):

Any environmental type enclosure intended for use with conduit hubs, closure plates and/or other field installed equipment (such as push-button, door latches, and the like), but shipped from the factory without them, shall be marked or provided with instructions that identifies the type of the equipment that shall be used to maintain the environmental type designation of the enclosure.

Any marking that is required to be permanent shall be molded, die-stamped, paint-stenciled, stamped or etched metal that is permanently secured, or indelibly stamped lettering on a pressure-sensitive label secured by adhesive.

The Marking and Labeling shall be R/C Marking and Labeling Systems (PGDQ2) or Printing Materials (PGJI2). The marking labels are outdoor or indoor type.

Following marking need not be permanent and could be provided on instruction sheet:

For Canadian specification required by clauses 4.2.5.11 and consequently 5.42, Equipment shall be marked with the following or equivalent wording:

"WARNING: When mounting on or over a combustible surface, a floor plate of at least 1.43 mm galvanized or 1.6 mm uncoated steel extended at least 150 mm beyond the equipment on all sides must be installed."

## CONSTRUCTION DETAILS:

Products covered by this report shall comply with applicable component, construction rating and marking requirements contained in UL508A, the Standard for Industrial Control Panels, and any additional information provided in this Procedure.

Some details of construction are covered in the following photographs and accompanying descriptive pages.

- Corrosion Protection - It is provided for all ferrous metal parts:
- \* -painted steel **for Type 1, 12;**
  - painted steel using R/C (DFOV2) paint or** galvanized steel **for Type 1, 12, 4;**
  - Stainless steel **AISI 304 or 316 for Type 1, 12, 4, 4X.**

Gaskets - Any doors and panels of the enclosures are provided with gasket around the periphery of the metallic structure edges. R/C Gasket Materials (JMST2), manufactured by Sonderhoff Chemicals GmbH, material designation Fermapor K31-A-9025-2-VP2. See Ill. 1 for gasket shape and dimensions.

Double doors models are provided with a central gasket type PVC designated "EKP-PF55E" manufactured by Ekmen Plastik. See Ills. 2 and 3 for gasket shape and dimensions and technical information.

## and Report

## CONSTRUCTION DETAILS (Cont'd)

Thickness - Minimum thickness of sheet metal enclosure, carbon or stainless steel (from UL Standard UL508A Industrial Control Equipment Table 63.1)

TABLE I

Without supporting frame (a)		With supporting frame or equivalent reinforcement (a)		Minimum required Thickness, in
Maximum width (b)	Maximum length (c)	Maximum width (b)	Maximum length (c)	
inches (cm)	inches (cm)	inches (cm)	inches (cm)	inches (mm)
4.0 (10.2)	Not limited	6.25 (15.9)	Not limited	0.020 (0.51)
4.75 (12.1)	5.75 (14.6)	6.75 (17.1)	8.25 (21.0)	
6.0 (15.2)	Not limited	9.5 (24.1)	Not limited	0.026 (0.66)
7.0 (17.8)	8.75 (22.2)	10.0 (25.4)	12.5 (31.8)	
8.0 (20.3)	Not limited	12.0 (30.5)	Not limited	0.032 (0.81)
9.0 (22.9)	11.5 (29.2)	13.0 (33.0)	16.0 (40.6)	
12.5 (31.8)	Not limited	19.5 (49.5)	Not limited	0.042 (1.07)
14.0 (35.6)	18.0 (45.7)	21.0 (53.3)	25.0 (63.5)	
18.0 (45.7)	Not limited	27.0 (68.6)	Not limited	0.053 (1.35)
20.0 (50.8)	25.0 (63.5)	29.0 (73.7)	36.0 (91.4)	
22.0 (55.9)	Not limited	33.0 (83.8)	Not limited	0.060 (1.52)
25.0 (63.5)	31.0 (78.7)	35.0 (88.9)	43.0 (109.2)	
25.0 (63.5)	Not limited	39.0 (99.1)	Not limited	0.067 (1.70)
29.0 (73.7)	36.0 (91.4)	41.0 (104.1)	51.0 (129.5)	
33.0 (83.8)	Not limited	51.0 (129.5)	Not limited	0.080 (2.03)
38.0 (96.5)	47.0 (119.4)	54.0 (137.2)	66.0 (167.6)	
42.0 (106.7)	Not limited	64.0 (162.6)	Not limited	0.093 (2.36)
47.0 (119.4)	59.0 (149.9)	68.0 (172.7)	84.0 (213.4)	
52.0 (132.1)	Not limited	80.0 (203.2)	Not limited	0.108 (2.74)
60.0 (152.4)	74.0 (188.0)	84.0 (213.4)	103.0 (261.6)	
63.0 (160.0)	Not limited	97.0 (246.4)	Not limited	0.123 (3.12)
73.0 (185.4)	90.0 (228.6)	103.0 (261.6)	127.0 (322.6)	
(a) See 63.1.4				
(b) The width is the smaller dimension of a rectangular piece of sheet metal that is part of an enclosure. Adjacent surfaces of an enclosure other than the cover shall comply with 63.1.5 and 63.1.6 or be made of a single sheet.				
(c) Not limited applies only when the edge of the surface is flanged at least 1/2 inch (12.7 mm) or fastened to adjacent surfaces not routinely removed in use.				

Minimum thickness of sheet metal for doors and covers steel surface-mounted enclosure may be less than specified in the above Table I if provided with reinforcing bars.

## CONSTRUCTION DETAILS (Cont'd)

Frame - Painted steel or Stainless steel profile, 1.30 mm minimum thickness. The frame is welded in any corner.

Rear and sides - Painted steel or stainless steel, door is 1.5 mm minimum thick flanged 16.3 mm, rear and side panels are 1.50 mm. The perimeter provided with gasket. Refer to gasket section for further details.

Hinge - Steel zinc plated or painted, riveted to the enclosure. At least two hinges shall be provided for each door. Hinges shall be spaced as specified in Table II. The spacing between hinges is to be measured between centers of the hinges; the spacing between a hinge and the end of a door or cover is to be measured from the edge of the hinge.

Table II

Maximum hinge spacing for metallic enclosures

From Each End of Door or Cover Mm	Between Hinge Centers Mm
102	914
152 (a)	914
254 (b)	914
229	914
305	1016

- (a) Hinges may be spaced 152 mm from the end of a door or a cover; may not be more than 1.14 m long on the hinged side.
- (b) Hinges may be spaced 254 mm from the end of a door or a cover having three hinges.

Hinged Door - All Series. Painted steel or stainless steel, 2.0 mm thick. Enclosures having a width of 1000 mm or less provided with one door and enclosures having a width of over 1000 mm provided with two doors.

## CONSTRUCTION DETAILS (Cont'd)

Enclosures Series TEOS and DM single door may be provided with an observation window made of tempered glass, minimum thickness 4.0 mm, fixed to the frame by polyurethane (manufactured by Sonderhoff, designated Fermadur A-120-1-VP1) and mechanical brackets. See Ills. 4, 5, 9, 10, 11 for mounting and dimensions and datasheet of Fermadur.

Latch - Each enclosure door or cover shall be provided with latches for firmly securing it in place. The means shall be positive in action and of substantial design and construction.

- 3-point locking for enclosures high 1400 and 1600 mm;
- 4-point locking for enclosures high 1800 and 2000 mm;
- 5-point locking for enclosures high 2200 mm;

Base - painted steel, width depending on enclosure dimensions, height 100 mm or 200 mm.

Series TEOS single door  
Series TEOS double door

FIG. 1  
FIG. 2

1. Hinged door - Painted sheet steel, minimum thickness 2.00 mm. Door is provided with gasket and latch for firmly securing it in place. For more details, refer to Construction Details.
2. Rear and Side panel - Painted sheet steel, minimum thickness 1.50 mm.
2. Mounting Plate (optional) - Galvanized steel support to allow a stable installation on the floor, minimum thickness 2.5 mm.
3. Supporting Frame - minimum thickness 1.3 mm; square shape of 20.5 mm.
4. Frame - Galvanized steel profile, minimum thickness 1.50 mm. For more details, refer to Construction Details.

Series DM single door and double door

FIG. 3

1. Front door - Painted steel or stainless steel, 2.0 mm minimum thickness. Door is provided with gasket and latch for firmly securing it in place. For more details, refer to Construction Details.
2. Body - Painted steel or stainless steel, 1.2 mm minimum thickness. For more details, refer to Construction Details.