KUBRICKY CONSTRUCTION CORP.
269 BALLARD ROAD

WILTON, NY 12831
518 792-5864

KUBRICKY CONSTRUCTION CORP.
A PROUD MEMBER OF THE D.A. COLLINS™ COMPANIES
An Equal Opportunity Employer

Rutland City BRF 3000 (2014036)
SUBMITTAL 70

Issued **09/08/15**
Respond by 09/22/15

To

Timothy Pockette, PE

Topic	BRF3000 Subm 70 (16) Pump Station Modification Electric Submittals - Benson Electric
Spec section	900.645

Message: Please see attached submittal package for the Dorr Drive Pump Station Electrical Modifications to be performed by Benson Electric.

Courtesy Copy

Volker H.D. Burkowski

From

Mike Martin

Signed by Mike C. Martin Date September 8, 2015

Proceed as Indicated _____ Date _____
Owner Authorized Representative

FAX FAX

From: Benson Electric Inc.

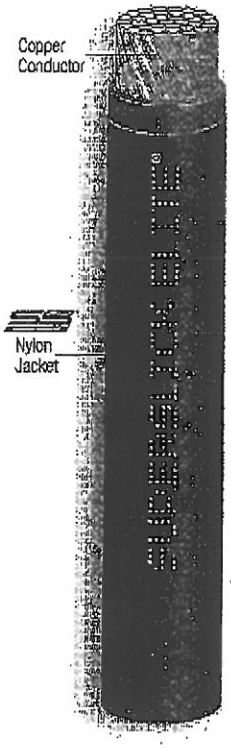
To: Volker

RE: Cut Sheets for Deer Dr Pump Station Rumsey Rd

18 Pgs + Cover

TYPE THHN/MTW/THWN-2/T90 COPPER CONDUCTOR SUPERSLICK ELITE®

ENGINEERING SPECIFICATIONS:



Stranded E-156879

Standards:

Underwriters Laboratories Standards UL-83, UL-1063, UL-758
AWM Spec 1316, 1317, 1318, 1319, 1320, 1321
ASTM Stranding Class B3, B8, B787
Federal Specification A-A-59544
Canadian Standards Association C22.2 No. 75
NEMA WC70/ICEA S-95-658
UL 1685-FT4/IEEE 1202 (70,000 Btu/hr) Flame Test (1/0 AWG and larger)
ICEA T-29-520 (210,000 Btu/hr) Flame Test
ARRA 2009; Section 1605 "Buy American" Compliant

CONSTRUCTION:

Conductors:

Solid, uncoated copper conductors per ASTM-B3
Stranded, uncoated copper conductors per ASTM-B3, ASTM-B787 and ASTM-B8

Insulation:

Color-coded Polyvinyl Chloride (PVC), heat and moisture-resistant, flame-retardant compound per UL-1063 and UL-83

Applications:

Type THHN/THWN-2 building wire is intended for general purpose applications as defined by the National Electrical Code (NEC). Type THHN/THWN-2 is permitted for new construction or rewiring for 600-volt applications. For applications requiring Type THHN or THWN-2, the conductor is appropriate for use in wet or dry locations at temperatures not to exceed 90°C or not to exceed 75°C in oil or coolants. For applications requiring Type MTW, the conductor is appropriate for use in dry locations at 90°C, or not to exceed 60°C in wet locations or where exposed to oils or coolants.

Features:

A great alternative to eliminate the need for lube. Slick Nylon outer jacket for easy pulling. SuperSlick Elite® is available in sizes 14 AWG through 1000 KCMIL. All sizes rated gasoline and oil resistant II. On 250 KCMIL and larger, sequential footage markings located every foot for easy measuring. For 1 AWG through 4/0 AWG sequential foot markings located on master reels only unless otherwise specified. 6 AWG and larger Sunlight Resistant in all colors. 1/0 AWG and larger are rated for cable tray use and comply with IEEE 1202/FT4 (70,000 Btu/hr.) flame test and ICEA T-29-20 (210,000 Btu/hr.) flame test.

Jacket:

A tough, polyamide, Nylon outer covering per UL-1063 and UL-83.

TYPE THHN/MTW/THWN-2/T90 COPPER CONDUCTOR SUPERSLICK ELITE® 600V

Size (AWG or KCMIL)	Number of Strands	Cross Sect. Area (mm²)	Diameter of Bare Copper (in)	PVC Insulation Thickness (Conductor)		Nylon Jacket Thickness		Outside Diameter		Approximate Net Weight		Allowable Ampacity (Amps)*			Standard Packaging (ft)
				(mm)	(in)	(mm)	(in)	(mm)	(in)	(kg/km)	(lbs/1000 ft)	60°C	75°C	90°C	
14	19	2.08	0.0710	0.380	0.015	0.100	0.004	2.77	0.109	25	16	15	20	25	2000' carton (4 x 500'), 2500' reels
12	19	3.31	0.0880	0.380	0.015	0.100	0.004	3.23	0.127	36	23	20	25	30	2000' carton (4 x 500'), 2500' reels
10	19	5.26	0.1110	0.510	0.015	0.100	0.004	4.07	0.160	57	38	30	35	40	100' carton, 2500' reels
8	19	8.37	0.1480	0.760	0.030	0.130	0.005	5.39	0.212	97	62	40	50	55	500' 1000' 2500' 5000' reels
6	19	13.30	0.1840	0.760	0.030	0.130	0.005	6.30	0.248	141	94	55	65	75	500' 1000' 2500' 5000' reels
4	19	21.20	0.2320	1.020	0.040	0.150	0.006	8.05	0.317	228	153	70	85	95	500' 1000' 2500' 5000' 10,000' reels
3	19	26.70	0.2600	1.020	0.040	0.150	0.006	8.74	0.344	281	189	85	100	110	500' 1000' 2500' 5000' 15,000' reels
2	19	33.60	0.2920	1.020	0.040	0.150	0.006	9.53	0.375	348	233	95	115	130	500' 1000' 2500' 5000' 14,000' reels
1	19	42.40	0.3280	1.270	0.050	0.180	0.007	11.05	0.435	445	298	110	130	150	500' 1000' 2500' 5000' 22,000' reels
1/0	19	53.50	0.3680	1.270	0.050	0.180	0.007	12.04	0.474	554	372	125	150	170	500' 1000' 2500' 5000' 18,000' reels
2/0	19	67.40	0.4040	1.270	0.050	0.180	0.007	13.16	0.518	687	462	145	175	195	500' 1000' 2500' 5000' 14,000' reels
3/0	19	85.00	0.4540	1.270	0.050	0.180	0.007	14.43	0.568	851	572	165	200	225	500' 1000' 2500' 5000' 12,000' reels
4/0	19	107.00	0.5100	1.270	0.050	0.180	0.007	15.85	0.624	1059	712	195	230	260	500' 1000' 2500' 5000' 9000' reels
250	37	127.00	0.5420	1.520	0.060	0.200	0.008	17.23	0.678	1266	849	215	255	290	500' 1000' 2500' 4000' 8500' reels
300	37	152.00	0.5940	1.524	0.060	0.203	0.008	18.54	0.730	1503	1010	240	285	320	500' 1000' 3500' 7000' reels
350	37	177.00	0.6410	1.520	0.060	0.200	0.008	19.74	0.777	1741	1170	260	310	350	500' 1000' 3000' 6000' reels
400	37	203.00	0.6850	1.524	0.060	0.203	0.008	20.85	0.821	1979	1330	280	335	380	500' 1000' 3000' 5000' reels
500	37	253.00	0.7660	1.520	0.060	0.200	0.008	22.91	0.902	2455	1650	320	380	430	500' 1000' 2500' 4000' reels
600	61	304.00	0.8930	1.778	0.070	0.229	0.009	26.70	1.051	3004	2019	355	420	475	500' 1000' 2000' 3000' reels
750	61	380.00	0.9980	1.778	0.070	0.229	0.009	29.36	1.156	3767	2466	400	475	535	500' 1000' 1500' 2500' reels
1000	61	507.00	1.1520	1.778	0.070	0.229	0.009	33.27	1.310	4851	3260	455	545	615	500' 1000' reels

*Conductor sizes 14 - 10 AWG: Refer to National Electric Code® Section 240.4(D) for conductor overcurrent protection limitations. The above data is approximate and subject to normal manufacturing tolerances.

*Allowable ampacity shown above is per the National Electrical Code. The above data is approximate and subject to normal manufacturing tolerances.

PRINT LEGEND:
STRANDED CONDUCTORS-SIZE 14 AWG THROUGH 8 AWG: ENCORE WIRE CORPORATION (size) TYPE MTW OR THHN OR THWN-2 GR II VW-1 600 VOLTS (UL) OR AWM OR C(UL) TYPE T90 NYLON OR TWN 75 FT1 DATE/TIME/OPER/QC
STRANDED CONDUCTORS-SIZES 6 AWG THROUGH 1 AWG: ENCORE WIRE CORPORATION (size) TYPE MTW OR THHN OR THWN-2 GR II SUN RES VW-1 600 VOLTS (UL) OR AWM OR C(UL) TYPE T90 NYLON OR TWN 75 FT1 DATE/TIME/OPER/QC
CONDUCTOR SIZES 1/0 AWG THROUGH 1000 KCMIL: ENCORE WIRE CORPORATION (size) TYPE MTW OR THHN OR THWN-2 GR II SUN-RES FOR CT USE (UL) OR C(UL) TYPE T90 NYLON OR TWN 75 FT1 DATE/TIME/OPER/QC

SUPERSLICK ELITE® MANUFACTURED UNDER PATENT NO. 8,668,575

09/03/2015 12:00 8027755208 BENSON ELECTRIC INC PAGE 01/19

Made in the USA Product - Zinc

Made in the USA Zinc Set Screw Connectors for EMT

Cat. Number	Trade Size	Dim A	Dim B	Dim C
230-DC2*	1/2"	1.13"	0.75"	0.94"
231-DC2*	3/4"	1.44"	1.31"	1.19"
232-DC2*	1"	1.63"	1.06"	1.44"
233-DC2*	1 1/4"	2.00"	1.38"	1.88"
234-DC2*	1 1/2"	2.31"	1.56"	2.06"
235-DC2*	2"	2.56"	1.81"	2.56"
236-DC2*	2 1/2"	3.13"	2.13"	3.25"
237-DC2*	3"	3.35"	2.35"	3.89"
238-DC2*	3 1/2"	3.56"	2.56"	4.50"
239-DC2*	4"	3.69"	2.69"	5.00"

*Change suffix to "-DCI2" for Insulated Version

Description: US Made Zinc Set Screw Connectors

Application: Used to join EMT conduit to a box or enclosure in dry locations

UL Standard: UL-514B

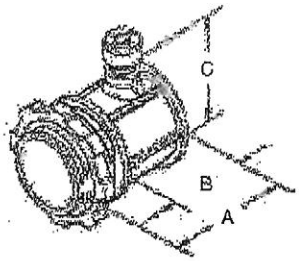
UL File Number: E24001

CSA File Number: LR39354

Federal Specification: A-A-50553

NEMA Standard: FB-1

UNSPC: 39121434



Made in the USA Zinc Set Screw Couplings for EMT

Cat. Number	Trade Size	Dim A	Dim B
240-DC	1/2"	1.50"	0.94"
241-DC	3/4"	1.88"	1.19"
242-DC	1"	2.06"	1.44"
243-DC	1 1/4"	2.50"	1.88"
244-DC	1 1/2"	2.88"	2.06"
245-DC	2"	3.44"	2.50"
246-DC	2 1/2"	4.00"	3.26"
247-DC	3"	4.50"	3.89"
248-DC	3 1/2"	5.00"	4.46"
249-DC	4"	5.25"	4.99"

Description: US Made Zinc Set Screw Couplings

Application: Used to join EMT conduit in dry locations

UL Standard: UL-514B

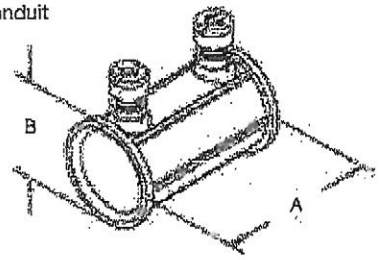
UL File Number: E24001

CSA File Number: LR39354

Federal Specification: A-A-50553

NEMA Standard: FB-1

UNSPC: 39121434



Made in the USA Zinc Compression Connectors for EMT

Cat. Number	Trade Size	Dim A	Dim B	Dim C
250-DC2*	1/2"	0.88"	1.25"	1.08"
251-DC2*	3/4"	0.88"	1.34"	1.44"
252-DC2*	1"	0.94"	1.50"	1.69"
253-DC2*	1 1/4"	1.13"	1.75"	2.18"
254-DC2*	1 1/2"	1.31"	2.00"	2.44"
255-DC2*	2"	1.38"	2.12"	2.94"
256-DC2*	2 1/2"	1.88"	3.00"	3.62"
257-DC2*	3"	2.25"	3.25"	4.25"
258-DC2*	3 1/2"	2.50"	3.50"	4.80"
259-DC2*	4"	2.75"	3.75"	5.25"

*Change suffix to "-DCI2" for Insulated Version

Description: US Made Zinc Compression Connectors

Application: Used to join EMT conduit to a box or enclosure in dry locations or in concrete tight applications

UL Standard: UL-514B

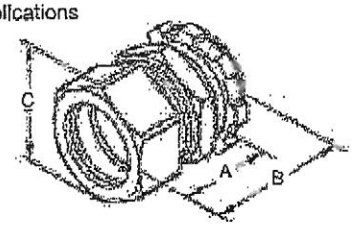
UL File Number: E24001

CSA File Number: LR39354

Federal Specification: A-A-50553

NEMA Standard: FB-1

UNSPC: 39121311



Made in the USA Zinc Set Compression Couplings for EMT

Cat. Number	Trade Size	Dim A	Dim B
260-DC	1/2"	1.38"	1.08"
261-DC	3/4"	1.62"	1.44"
262-DC	1"	1.63"	1.69"
263-DC	1 1/4"	2.06"	2.18"
264-DC	1 1/2"	2.25"	2.44"
265-DC	2"	2.75"	2.94"
266-DC	2 1/2"	3.75"	3.62"
267-DC	3"	4.00"	4.25"
268-DC	3 1/2"	4.19"	4.88"
269-DC	4"	4.75"	5.25"

Description: US Made Zinc Set Compression Couplings

Application: Used to join EMT conduit in dry locations or in concrete tight applications

UL Standard: UL-514B

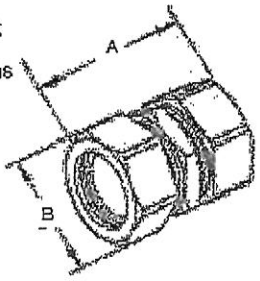
UL File Number: E24001

CSA File Number: LR39354

Federal Specification: A-A-50553

NEMA Standard: FB-1

UNSPC: 39121311



Graybar Electric Co.
TIM WIERZBICKI, Sales
775-2555/800-753-2577
FAX: 802-775-3863
Tim Wierzbicki@graybar.com

BRIDGEPORT

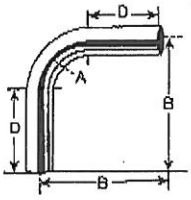
Electrical Metallic Tubing (EMT) Elbows

allied TUBE & CONDUIT™
A PART OF atkore

EMT 90° Elbows

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3

Trade Size	Metric Designator	Radius (A)[1]		Offset (B)[2]		Straight (D)[1]		Approximate Weight Per 100 Pieces		Standard Package
		in	mm	in	mm	in	mm	lb	kg	
1/2	16	4	102	5 7/8	149	1 1/2	38	25	11.3	25
3/4	21	4 1/2	114	7	178	1 1/2	38	46	20.9	50
1	27	5 3/4	146	8 3/4	222	1 7/8	48	84	38.1	25
1 1/4	35	7 1/4	184	10 1/8	257	2	51	144	65.3	20
1 1/2	41	8 1/4	210	11 3/4	298	2	51	193	87.5	15
2	53	9 1/2	241	14	356	2	51	296	134.3	10
2 1/2	63	10 1/2	267	16 1/4	413	3	76	504	228.6	1
3	78	13	330	18 3/4	476	3 1/8	79	701	318.0	1
3 1/2	91	15	381	21 1/4	540	3 1/4	83	1047	474.9	1
4	103	16	406	23 3/8	594	3 3/8	86	1310	594.2	1

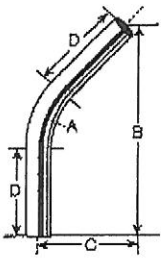


[1]Minimum requirement as per UL Standard
[2]Dimensions and weights are approximate
Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.
Also available in the following Degrees (60°, 45°, 30°, 22-1/2°, 15° & 11-1/4°)

EMT 45° Elbows

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3

Trade Size	Metric Designator	Radius (A)[1]		Offset (B)[2]		Offset (C)[2]		Straight (D)[1]		Approximate Weight Per 100 Pieces		Standard Package
		in	mm	in	mm	in	mm	in	mm	lb	kg	
1/2	16	4	102	6 1/8	156	2 1/2	64	1 1/2	38	18	8.2	25
3/4	21	4 1/2	114	7 3/8	187	3 1/8	79	1 1/2	38	33	15.0	50
1	27	5 3/4	146	8 3/4	222	3 5/8	92	1 7/8	48	56	25.4	25
1 1/4	35	7 1/4	184	10 1/8	257	4 1/8	105	2	51	97	44.0	20
1 1/2	41	8 1/4	210	13 1/8	333	5 3/8	137	2	51	185	83.9	10
2	53	9 1/2	241	13 1/8	333	5 1/2	140	2	51	185	83.9	10
2 1/2	63	10 1/2	267	17 1/2	445	7 1/4	184	3	76	360	163.3	1
3	78	13	330	17 1/2	445	7 1/4	184	3 1/8	79	438	198.7	1
3 1/2	91	15	381	26 1/8	664	10 7/8	276	3 1/4	83	873	396.0	1
4	103	16	406	26 1/4	667	10 7/8	276	3 3/8	86	983	445.9	1



[1]Minimum requirement as per UL Standard
[2]Dimensions and weights are approximate
Sizes 2-1/2 (63) and larger shipped in palletized cartons or bulk.
Also available in the following Degrees (90°, 60°, 30°, 22-1/2°, 15° & 11-1/4°)

Graybar Electric Co.
TIM WIERZBICKI, Sales
775-2555/800-753-2577
FAX: 802-775-3863
E-mail: Tim.Wierzbicki@graybar.com

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

16100 S. Lathrop Ave., Harvey, IL 60426
Phone / 708.339.1610 • Toll-Free / 800.882.5543

www.alliedeg.com

Electrical Metallic Tubing (EMT) and True Color™ EMT

allied TUBE & CONDUIT®
A PART OF atkore

FEATURES & SPECIFICATIONS

Manufactured for Long Life

Allied Tube & Conduit® EMT is precision manufactured from high grade mild strip steel for exceptional durability and long-lasting life. Allied EMT is hot galvanized using a patented inline Flo-Coat® process. This process combines zinc, a conversion coating, and a clear organic polymer topcoat to form a triple layer of protection against corrosion and abrasion.

E-Z Pull® EMT combines strength with ductility, providing easy bending, cutting and joining while resisting flattening, kinking and splitting. Available in sizes 1/2 (16) - 4 (103).

Coatings

Allied's EMT (Electrical Metallic Tubing) has a special low friction ID coating called E-Z Pull that greatly improves the slip properties between conduit and wire. With E-Z Pull EMT, wire pulls through the EMT smoothly and easily, making installation easier and faster.

EMI Shielding

Allied EMT is very effective in reducing electromagnetic field levels for encased power distribution circuits, shielding computers and other sensitive electronic equipment from the effects of electromagnetic interference.
For more information on EMT shielding, visit www.alliedeg.com to obtain the **GEMI** (**G**rounding and **E**lectro-**M**agnetic **I**nterference) software analysis program.

Codes & Standards Compliance

Allied EMT is listed to Underwriters Laboratories Safety Standard UL 797 and meets ANSI C80.3. These standards have been adopted as federal specifications in lieu of WWC 563. EMT is recognized as an equipment grounding conductor by NEC Section 250-118. Documentation for compliance with NEC Article 250 is also available in the **GEMI** (**G**rounding and **E**lectro-**M**agnetic **I**nterference) analysis software and related research studies found at the www.alliedeg.com website.

Installation of EMT shall be in accordance with the National Electrical Code and the UL listing information. Allied EMT is listed in category FJMX. Master bundles conform to NEMA Standard RN2.

Specification Data

To specify Allied EMT, include the following: Electrical Metallic Tubing shall be equal to that manufactured by Allied Tube & Conduit Corporation. EMT shall be hot galvanized steel O.D. with an organic corrosion resistant I.D. coating, and shall be listed to UL Safety Standard 797 and manufactured in accordance with ANSI C80.3.

Electrical Metallic Tubing (EMT) and True Color™ EMT

Listed to Underwriters Laboratories Safety Standard UL 797
Manufactured in accordance with ANSI C80.3

Trade Size	Metric Designator	Outside Diameter[1]		Nominal Wall Thickness[2]		Approximate Weight Per 100 Ft. (30.5M)		Red and Galvanized Master Bundle Quantity		True Color** Bundle Qty.	
		in	mm	in	mm	lb	kg	ft	m	ft	m
1/2	16	0.706	17.93	0.042	1.07	30	13.6	7000	2135	3500	1066.8
3/4	21	0.922	23.42	0.049	1.24	46	20.9	5000	1525	2500	762.0
1	27	1.163	29.54	0.057	1.45	67	30.4	3000	915	1500	457.2
1-1/4	35	1.510	38.35	0.065	1.65	101	45.8	2000	610	2000	609.6
1-1/2	41	1.740	44.20	0.065	1.65	119	53.9	1500	457.5	1500	457.2
2	53	2.197	55.80	0.065	1.65	148	67.1	1200	366.0	1200	365.7
2-1/2	63	2.875	73.03	0.072	1.83	216	98.0	610	186.1	610	185.9
3	78	3.500	88.90	0.072	1.83	263	119.3	510	155.6	510	155.4
3-1/2	91	4.000	101.60	0.083	2.11	349	158.3	370	112.8	370	112.7
4	103	4.500	114.30	0.083	2.11	393	178.3	300	91.5	300	91.5

[1]Outside diameter tolerances: +/- .005 in. (.13mm) for trade sizes 1/2 (16mm) through 2 (53mm);
+/- .010 in. (.25mm) for trade sizes 2-1/2 (63mm);
+/- .015 in. (.38mm) for trade size 3 (78mm);
+/- .020 in. (.51mm) for trade sizes 3-1/2 (91mm) and 4 (103mm).

*Blue trade size 1 master bundle size: 3000 ft / 915 m
** Other Color Trade Sizes 2 - 4 are available thru special order
NOTE: Length = 10 ft. (3.05m) with a tolerance of +/- .25 in. (6.35 mm)

NOTE: Special orders are non-cancelable, non-returnable and non-refundable

16100 S. Lathrop Ave., Harvey, IL 60426
Phone / 708.339.1610 • Toll-Free / 800.882.5543

Graybar Electric Co.
TIM WIERZBICKI, Sales
alliedeg.com
775-2555/800-753-2577
FAX: 802-775-3863
E-mail: Tim.Wierzbicki@graybar.com

Medium - Clear

Recommended pipe application and sizes	Set-up time (Evaporation Rate)	Recommended installation temp.	Lap Shear @ 73°F	Viscosity at 75°F as manufactured
Recommended for all grades and types of Carlon PVC conduit, duct, wireway and fittings, except Flex-Plus® Blue™ ENT (Electrical Nonmetallic Tubing.) **Up through 6" diameter.**	10°-30°F Not recommended 30°-50°F 5-6 minutes 50°-70°F 3-4 minutes 70°-90°F 1-2 minutes	40° to 100°F	2 hrs. 350 psi 16 hrs. 800 psi 72 hrs. 1,500 psi	500-900 cps

Part No.	Size	Applicator	Description	Ctn. Qty.	Ctn. Wt. (lbs.)
VC9963	Pint	Dauber	PVC Medium Clear	24	29.0
VC9962	Quart	Dauber	PVC Medium Clear	12	27.5
VC9961P	Gallon	–	PVC Medium Clear	6	53.5

Meets ASTM D-2564

Medium - Gray

Recommended pipe application and sizes	Set-up time (Evaporation Rate)	Recommended installation temp.	Lap Shear @ 73°F	Viscosity at 75°F as manufactured
Recommended for all grades and types of Carlon PVC conduit, duct, wireway and fittings, except Flex-Plus® Blue™ ENT (Electrical Nonmetallic Tubing.) **Up through 6" diameter.**	10°-30°F Not recommended 30°-50°F 5-6 minutes 50°-70°F 3-4 minutes 70°-90°F 1-2 minutes	40° to 100°F	2 hrs. 350 psi 16 hrs. 800 psi 72 hrs. 1,500 psi	500-900 cps

Part No.	Size	Applicator	Description	Ctn. Qty.	Ctn. Wt. (lbs.)
VC9923	Pint	Dauber	PVC Medium Gray	24	29.0
VC9922	Quart	Dauber	PVC Medium Gray	12	27.5
VC9941P	Gallon	–	PVC Medium Gray	6	53.5

Meets ASTM D-2564

Regular - Clear

Recommended pipe application and sizes	Set-up time (Evaporation Rate)	Recommended installation temp.	Lap Shear @ 73°F	Viscosity at 75°F as manufactured
Recommended for all grades and types of Carlon PVC conduit, duct, wireway and fittings, except Flex-Plus® Blue™ ENT (Electrical Nonmetallic Tubing.) **Up through 6" diameter.**	10°-30°F Not recommended 30°-50°F 5-6 minutes 50°-70°F 3-4 minutes 70°-90°F 1-2 minutes	40° to 100°F	2 hrs. 350 psi 16 hrs. 800 psi 72 hrs. 1,500 psi	500-900 cps

Part No.	Size	Applicator	Description	Ctn. Qty.	Ctn. Wt. (lbs.)
VC9964	1/2 Pint	Dauber	PVC Regular Clear	10	29.06.5

Meets ASTM D-2564

Regular - Gray

Recommended pipe application and sizes	Set-up time (Evaporation Rate)	Recommended installation temp.	Lap Shear @ 73°F	Viscosity at 75°F as manufactured
Recommended for all grades and types of Carlon PVC conduit, duct, wireway and fittings, except Flex-Plus® Blue™ ENT (Electrical Nonmetallic Tubing.) **Up through 6" diameter.**	10°-30°F Not recommended 30°-50°F 5-6 minutes 50°-70°F 3-4 minutes 70°-90°F 1-2 minutes	40° to 100°F	2 hrs. 350 psi 16 hrs. 800 psi 72 hrs. 1,500 psi	500-900 cps

Part No.	Size	Applicator	Description	Ctn. Qty.	Ctn. Wt. (lbs.)
VC9924-24	1/2 Pint	Dauber	PVC Regular Gray	24	15.0

Meets ASTM D-2564

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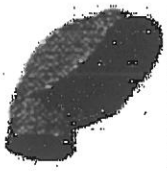
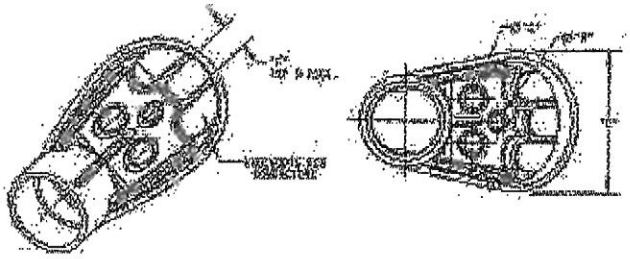
Caps

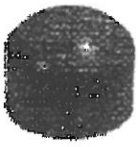
Service Entrance Caps



Part No.	Size	Std. Ctn. Qty.	Dimensions (in.) F	G	H
E998D	1/2	5	.45	.45	–
E998E	3/4	20	.45	.45	–
E998E-CAR	3/4	5	.45	.45	–
E998F	1	15	.59	.58	–
E998F-CAR	1	5	.59	.58	–
E998G-CAR	1 1/4	5	.74	.71	.50
E998H-CAR	1 1/2	5	.74	.71	.50
E998J-CAR	2	5	.83	.78	.56
E998K-UPC	2 1/2	2	1.70	1.31	1.00
E998L	3	2	1.70	1.31	1.00
E998N	4	2	2.25	1.88	1.31

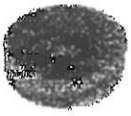


End Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E958D	1/2	100	3
▶ E958E	3/4	100	4
▶ E958F	1	75	4
▶ E958G	1 1/4	40	4
▶ E958H	1 1/2	30	4
▶ E958J	2	25	5
▶ E958K	2 1/2	10	4
▶ E958L	3	10	5
▶ E958N	4	5	17
▶ E958P	5	5	11
▶ E958R	6	5	12

PVC Riser Caps



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E935J	2	25	9
▶ E935L	3	25	18
▶ E935N	4	25	18
▶ E935P	5	25	35
▶ E935R	6	10	13

Offsets

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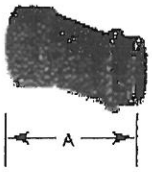
E32447
Except where noted by ▶

Meter Offset



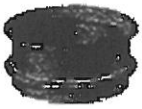
Part No.	Size	Std. Ctn. Qty.	Offset	A
▶ E995G	1 1/4	15	0.758	4.230
E995G-CTN	1 1/4	6	0.758	4.230
▶ E995J	2	8	0.684	4.270

Offset

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Qty. Wt. (lbs.)
▶ E994DR-CAR	1/2	25	3
▶ E994ER-CAR	3/4	15	2
▶ E994F	1	50	12

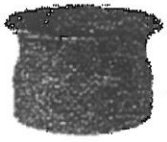
End Bells

End Bells



Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E997F	1	50	1
▶ E997F-CAR	1	15	1
▶ E997G	1 1/4	35	1
▶ E997G-CAR	1 1/4	15	1
▶ E997H	1 1/2	30	1
▶ E997H-CAR	1 1/2	10	1
▶ E997J	2	40	1
▶ E997J-CAR	2	10	1
▶ E997K	2 1/2	30	2
▶ E997K-CAR	2 1/2	10	2
▶ E997L	3	50	2
▶ E997L-CAR	3	10	2
▶ E997M	3 1/2	40	10
▶ E997N	4	30	11
▶ E997P	5	15	10
▶ E997R	6	10	7.4
▶ E997T	8	3	14.55

Fabricated End Bells Schedule 40



Part No.	Size	Std. Ctn. Qty.	Std. Wt. (lbs.)
E949J5	2" x 5"	50	10
E949J6	2" x 6"	25	12
E949JN	2" x 4"	25	7
E949JX	2" x 8"	12	7
E949LR	3" x 6"	20	21
E949N5	4" x 5"	20	2
E949NR	4" x 6"	15	21
E949R5	6" x 5"	12	27
E949RX	6" x 8"	6	17

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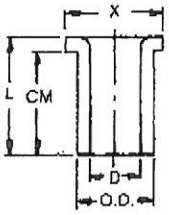
Adapters

Box Adapters for Enclosures

Adapts nonmetallic conduit to all electrical enclosures by inserting adapter through knockout and cementing into Carlon couplings.



Part No.	Size	Std. Ctn. Qty.	Min D	OD Typical	Max X	CM Typical	L Typical
E996D	1/2	100	.662	.840	1 7/64	23/32	27/32
E996E	3/4	100	.824	1.050	1 21/64	25/32	29/32
E996F	1"	100	1.049	1.315	1 5/8	29/32	1 3/32
E996G	1 1/4	50	1.380	1.660	1 31/32	1 1/16	1 1/4
E996H	1 1/2	50	1.610	1.900	2 13/64	1 3/16	1 3/8
E996J	2	25	2.067	2.375	2 29/32	1 1/4	1 7/16
E996K-CAR	2 1/2	10	2.469	2.875	3 3/16	1 7/8	1 15/16
E996L	3	20	3.068	3.500	4 1/8	2	2 1/16
E996L-CAR	3	5	3.068	3.500	4 1/8	2	2 1/16
E996N	4	10	4.026	4.500	5 1/8	2 1/2	2 1/4

Threaded Adapters

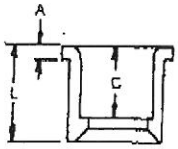
Part No.	Size	Std. Ctn. Qty.
E9842D [1]	1/2	25
E9842E [2]	3/4	25

[1] Fits 3/4" sockets [2] Fits 1" sockets

Reducers

Reducer Bushings

For connecting different sizes of conduit. Bell x Spigot.



Part No.	Size	Std. Ctn. Qty.	L Typical	A Typical	C Typical
E950ED	3/4" x 1/2"	100	15/32	13/64	21/32
E950FD-CAR	1" x 1/2"	25	1 11/32	3/16	57/64
E950FE	1" x 3/4"	100	1 11/32	3/16	1 1/64
E950GE-CAR	1 1/4" x 3/4"	10	1 15/32	3/16	1 1/64
E950GF	1 1/4" x 1"	50	1 15/32	3/16	1 9/64
E950HF-CAR	1 1/2" x 1"	10	1 19/32	3/16	1 9/64
E950HG-CAR	1 1/2" x 1 1/4"	10	1 19/32	3/16	1 17/64
E950JG-CAR	2" x 1 1/4"	10	1 3/4	7/32	1 17/64
E950JH-CAR	2" x 1 1/2"	10	1 3/4	7/32	1 25/64
E950KJ-CAR	2 1/2" x 2"	10	2 5/32	3/8	1 27/64
E950LJ-CAR	3" x 2"	10	2 1/8	1/4	1 7/8
▶ E950LK	3" x 2 1/2"	25	1 15/16	1/4	1 11/16
E950NL	4" x 3"	25	2 3/4	5/16	1 15/16

Reducers

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E32447
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Fabricated Reducers

Fabricated Reducers (Male x Male)

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E952KJ	2 1/2" x 2"	48	28
▶ E952LJ	3" x 2"	36	21
▶ E952LK	3" x 2 1/2"	36	31
▶ E952NL	4" x 3"	15	23
▶ E952NM	4" x 3 1/2"	15	32
▶ E952PN	5" x 4"	12	26
▶ E952RP	6" x 5"	10	31

Plugs

Reducer Plugs

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E971C	3/4" x 1/2"	100	2.5
▶ E971D	1" x 3/4"	100	3

Plugs (Polyethylene)

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ P258H	1 1/2"	50	1
▶ P258K	2 1/2"	25	1.5

Plugs with Pull Tabs (Polyethylene)

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ P258JT	2	60	3
▶ P258LT	3	30	3
▶ P258NT	4	48	3
▶ P258PT	5	30	6
▶ P258RT	6	30	9

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Couplings

Special Long Line Couplings – Sleeve Couplings

Sleeve Coupling *(For Repair Work)*
No Internal Stop

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E948H	1½	25	6
▶ E948J	2	25	5
▶ E948K	2½	25	16
▶ E948L	3	25	13
▶ E948N	4	10	8
▶ E948P	5	14	33
▶ E948R	6	6	16
▶ E948JR	2" (6" long)	15	8
▶ E948JS	2" (Sch. 40 Split Duct)	25	6
▶ E948L12	3" (12" long)	1	1
▶ E948L6	3" (6" long)	15	15
▶ E948LS	3" (Sch. 40 Split Duct)	25	17
▶ E948N12	4" (12" long)	10	28
▶ E948N7	4" (7" long)	15	25
▶ E948NS	4" (Sch. 40 Split Duct)	10	15
▶ E948PS	5" (Sch. 40 Split Duct)	1	2
▶ E948R10	6" (10" long)	6	25
▶ E948R12	6" (12" long)	6	25
▶ E948RS	6" (Sch. 40 Split Duct)	1	2

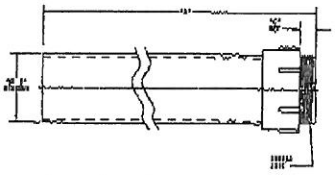
Special Schedule 40 Swedge Couplings

*Consult factory for additional sizes

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
▶ E442K	2½	20	33
▶ E442R	6	6	27
▶ E442T	8	2	17

Risers

Schedule 40



Part No.	Size	A (Length)	B (Min.)	C	Thread Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E954HX	1½	80.00	1.567	.950	1½" NPT	1	3.8
E954J	2	60.00	2.024	.825	2" NPT	1	3.7
E954JX	2	80.00	2.024	.825	2" NPT	1	5.0
E954K	2½	60.00	2.418	.812	2½" NPSC	1	6.0
E954KX	2½	80.00	2.418	.812	2½" NPSC	1	8.4
E954L	3	60.00	3.012	.798	3" NPSC	1	8.7
E954LX	3	80.00	3.012	.798	3" NPSC	1	11.0

Adapters

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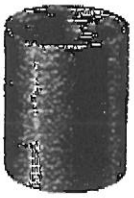
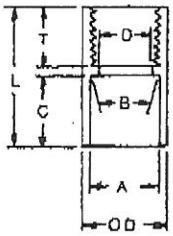
Female Adapters



For adapting nonmetallic conduits to threaded fittings, metallic systems. Female threads on one end, socket end on other.

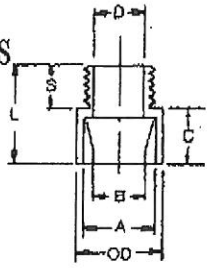


Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C Typical	T Typical	L Typical
E942D	½	150	.852	.836	.620	1 7/64	11/16	3/4	1 9/16
E942E	¾	100	1.064	1.046	.822	1 5/16	13/16	3/4	1 5/8
E942F	1	50	1.330	1.310	1.046	1 5/8	15/16	7/8	1 15/16
E942G	1¼	30	1.677	1.655	1.377	1 63/64	1	7/8	2
E942H	1½	25	1.918	1.894	1.607	2 5/32	1 1/8	7/8	2 27/32
E942J	2	30	2.393	2.369	2.064	2 47/64	1 3/16	1	2 5/16
E942K	2½	20	2.890	2.868	2.450	3 11/32	1 5/8	1 1/8	2 15/16
E942K-CAR	2½	4	2.890	2.868	2.450	3 11/32	1 5/8	1 1/8	2 15/16
E942L	3	25	3.515	3.492	3.000	3 31/32	1 3/4	1 1/8	3 1/16
E942L-CAR	3	3	3.515	3.492	3.000	3 31/32	1 3/4	1 1/8	3 1/16
E942M	3½	20	4.015	3.992	3.500	4 1/2	1 7/8	1 1/8	3 1/4
E942N	4	15	4.515	4.491	4.000	5 1/64	2	1 1/8	3 13/64
E942N-CAR	4	7	4.515	4.491	4.000	5 1/64	2	1 1/8	3 13/64
E942NX9*	4	15	(Call for information)						
E942P	5	8	5.593	5.553	5.047	6 1/4	1 15/16	1 1/16	3 3/16
E942R	6	6	6.658	6.614	6.055	7 1/4	2 1/8	1 1/16	3 3/8
E942RX*	6	6	(Call for information)						

* Long Line Adapter

Male Terminal Adapters

For adapting nonmetallic conduits to boxes, threaded fittings, metallic systems. Male threads on one end, socket end on other.



Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	Min. D	Max. OD	C Typical	S Typical	L Typical
E943D	½	150	.852	.836	.597	1 1/8	5/8	9/16	15/16
E943E	¾	125	1.064	1.046	.800	1 11/32	3/4	9/16	1 3/8
E943F	1	50	1.330	1.310	1.018	1 5/8	1	11/16	1 25/32
E943G	1¼	50	1.677	1.655	1.332	2 1/32	1	3/4	1 15/16
E943H	1½	25	1.918	1.894	1.566	2 5/32	1 3/16	3/4	2 1/16
E943J	2	50	2.393	2.369	2.000	2 21/32	1 3/16	3/4	2 1/8
E943K	2½	25	2.890	2.868	2.376	3 5/16	1 3/4	7/8	2 7/8
E943K-CAR	2½	5	2.890	2.868	2.376	3 5/16	1 3/4	7/8	2 7/8
E943L	3	45	3.515	3.492	2.954	4	1 15/16	7/8	3 1/16
E943L-CAR	3	5	3.515	3.492	2.954	4	1 15/16	7/8	3 1/16
E943M	3½	30	4.015	3.992	3.440	4 1/2	2 7/16	1 7/8	3 7/16
E943N	4	20	4.515	4.491	3.940	5 3/32	2 3/8	7/8	3 1/2
E943N-CAR	4	20	4.515	4.491	3.940	5 3/32	2 3/8	7/8	3 1/2
E943P	5	5	5.593	5.553	4.815	6 1/4	2 1/3	1	3 15/16
E943R	6	10	6.658	6.614	5.860	7 1/2	2 3/8	1	3 3/8

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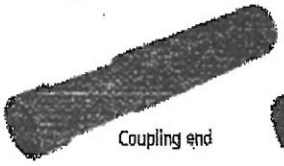
Expansion Fittings

c UL us LISTED E33447

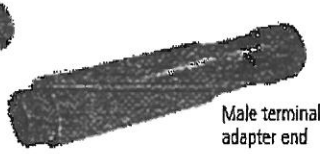
(For Use with Schedule 40 & 80 Conduit)

E945 series expansion fittings are designed to compensate for length changes due to temperature variations in exposed conduit runs.

- EXCLUSIVE Molded in Mid-point indicator on the piston.
- EXCLUSIVE 2" Expansion Fitting with an 8" travel distance.
- Two-piece molded design with lubricated seals for easier movement for the life of the product.
- Ridges on the fitting for easier installation (Sizes 2" through 6" only).
- Male terminal Adapter End design (1/2" – 2" NPT Threads, and 2 1/2" – 6" NPSC Threads).
- Two O-Rings to prevent leakage.
- Can be installed vertically or horizontally.



Coupling end



Male terminal adapter end

Coupling End Part No.	Male Terminal Adapter End Part No.	Size	Std. Ctn. Qty.	Travel Length (in.)
E945D	E945DX	1/2	20	4"
E945E	E945EX	3/4	15	4"
E945F	E945FX	1	10	4"
E945G	E945GX	1 1/4	5	4"
E945H	E945HX	1 1/2	5	4"
E945J	E945JX	2	15	8"
E945K	E945KX	2 1/2	10	8"
E945L	E945LX	3	10	8"
E945M	E945MX	3 1/2	5	8"
E945N	E945NX	4	5	8"
E945P	E945PX	5	1	8"
E945R	E945RX	6	1	8"

Short Expansion Couplings

c UL us LISTED E32447

(Expands to a maximum of 2")

Part No.	Size	Std. Ctn. Qty.
E955D	1/2	40
E955E	3/4	40
E955F	1	25
E955G	1 1/4	15
E955H	1 1/2	10
E955J	2	6

Couplings

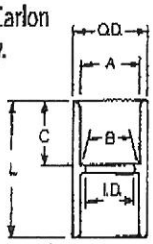
UL LISTED E32447

Except where noted by ▶

Standard Couplings

All socket fittings should be attached Using Carlon solvent cement. Using Carlon fittings with Carlon nonmetallic conduit insures system integrity.

Socket type for joining nonmetallic conduit.



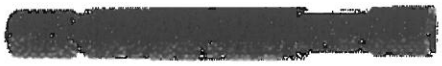
Part No.	Size	Std. Ctn. Qty.	A Typical	B Typical	I.D.	O.D.	C Typical	L Typical
E940D	1/2	150	.852	.836	.728	27/64	11/16	1 1/2
E940E	3/4	100	1.064	1.046	.840	15/16	3/4	1 5/8
E940F	1	50	1.330	1.310	1.210	1 15/64	15/16	2
E940G	1 1/4	30	1.677	1.655	1.535	1 63/64	1	2 1/8
E940H	1 1/2	25	1.918	1.894	1.755	2 15/64	1 1/8	2 7/8
E940J	2	30	2.393	2.369	2.190	2 47/64	1 3/16	2 1/2
E940K	2 1/2	20	2.890	2.868	2.688	3 5/16	1 33/64	3 3/16
E940K-CAR	2 1/2	4	2.890	2.868	2.688	3 5/16	1 33/64	3 3/16
E940L	3	25	3.515	3.492	3.375	3 31/32	1 3/4	3 13/32
E940L-CAR	3	5	3.515	3.492	3.375	3 31/32	1 3/4	3 13/32
E940M	3 1/2	20	4.015	3.992	3.780	4 9/16	1 7/8	3 7/8
E940N	4	15	4.515	4.491	4.265	5 3/32	1 25/32	3 3/4
E940N-CAR	4	5	4.515	4.491	4.265	5 3/32	1 25/32	3 3/4
E940P	5	8	5.593	5.553	5.097	6 1/4	1 5/16	4 1/16
E940R	6	5	6.658	6.614	6.115	7 1/2	2 7/16	4 5/8

Special Long Line Couplings

Long Line Couplings

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E941H	1 1/2	40	9
E941J	2	25	8
E941K	2 1/2	15	8
E941L	3	15	14
E941N	4	10	15
E941PF	5	4	12
▶ E941RF	6	5	21

Fabricated Expansion Couplings



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Part No.	Size	Std. Ctn. Qty.	Travel Length (in.)
E945KXL	2 1/2	10	12

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Corrosion Resistance of Carlon Schedule 40 and Schedule 80 PVC Conduit and Fittings

Carlon Schedule 40 and Schedule 80 are generally acceptable for use in environments containing the chemicals below. These environmental resistance ratings are based upon tests where the specimens were placed in complete submergence in the reagent listed. Schedule 40 and Schedule 80 can be used in many process areas where chemicals not on this list are manufactured or used because worker safety requirements dictate that any air presence or splashing be at a very low level.

If there are any questions for specific suitability in a given environment, prototype samples should be tested under actual conditions.

Acetic Acid 0-20%
Acetic Acid 20-30%
Acetic Acid 30-60%
Acetic Acid 80%
Acetic Acid—Glacial
Acetic Acid Vapors
Acetylene
Adipic Acid
Alum
Aluminum Chloride
Aluminum Fluoride
Aluminum Hydroxide
Aluminum Oxychloride
Aluminum Nitrate
Aluminum Sulfate
Ammonia-Dry Gas
Ammonium Bifluoride
Ammonium Carbonate
Ammonium Chloride
Ammonium Hydroxide 28%
Ammonium Metaphosphate
Ammonium Nitrate
Ammonium Persulfate
Ammonium Phosphate—Neutral
Ammonium Sulfate
Ammonium Sulfide
Ammonium Thiocyanate
Amyl Alcohol
Anthraquinone
Anthraquinonesulfonic Acid
Antimony Trichloride
Aqua Regia
Arsenic Acid 80%
Arylsulfonic Acid
Barium Carbonate
Barium Chloride
Barium Hydroxide
Barium Sulfate
Barium Sulfide
Beer—Sugar Liquor
Benzene Sulfonic Acid 10%
Benzoic Acid
Bismuth Carbonate
Black Liquor (Paper Industry)
Bleach—12.5% Active Cl
Borax
Boric Acid
Brine
Breeder Pellets—Dane, Fish
Bromic Acid
Bromine—Water
Butane
Butadiene
Butyl Alcohol
Butyl Phenol
Butylene
Butyric Acid
Calcium Bisulfite
Calcium Carbonate
Calcium Chlorate
Calcium Chloride
Calcium Hydroxide
Calcium Hypochlorite
Calcium Nitrate
Calcium Sulfate
Carbonic Acid
Carbon Dioxide Gas—Wet
Carbon Dioxide—Aqueous Solution
Carbon Monoxide
Caustic Potash
Caustic Soda
Chloracetic Acid
Chlorol Hydrate
Chlorine Gas (Dry)
Chlorine Gas (Moist)
Chlorine Water
Chlorosulfonic Acid
Chrome Alum
Chromic Acid 10%
Chromic Acid 30%
Chromic Acid 40%
Chromic Acid 50%
Citric Acid
Copper Chloride
Copper Cyanide
Copper Sulfate
Copper Nitrate
Copper Sulfate
Cottonseed Oil
Cresylic Acid 50%
Crude Oil—Sour
Crude Oil—Sweet
Demineralized Water
Dextrin
Dextrose
Diglycolic Acid
Disodium Phosphate
Ethyl Alcohol
Ethylene Glycol
Fatty Acids
Ferric Chloride
Ferric Nitrate
Ferric Sulfate
Ferrous Chloride
Ferrous Sulfate
Fluorine Gas—Wet
Fluorine Gas—Dry
Fluoroboric Acid
Fluorosilicic Acid
Formaldehyde
Formic Acid
Fructose
Gallic Acid
Gas—Coke Oven
Gas—Natural (Dry)
Gas—Natural (Wet)
Gasoline—Sour
Gasoline—Refined
Glucose
Glycerine (Glycerol)
Glycol
Glycolic Acid
Green Liquor (Paper Industry)
Heptane
Hexane, Tertiary
Hydrobromic Acid 20%
Hydrochloric Acid 0%—25%
Hydrochloric Acid 25%—40%
Hydrocyanic Acid or Hydrogen Cyanide
Hydrofluoric Acid 0%
Hydrofluorosilicic Acid
Hydrogen Phosphide
Hydrogen Sulfide—Dry
Hydrogen Sulfide—Aqueous Solution
Hydroquinone
Hydroxylamine Sulfate
Iodine
Kerosene
Lactic Acid 28%
Lauric Acid
Lauryl Chloride
Lauryl Sulfate
Lead Acetate
Lime Sulfur
Linoleic Acid
Linseed Oil
Lubricating Oils
Magnesium Carbonate
Magnesium Chloride
Magnesium Hydroxide
Magnesium Nitrate
Magnesium Sulfate
Maleic Acid
Malic Acid
Mercuric Chloride
Mercuric Cyanide
Mercurous Nitrate
Mercury
Methyl Sulfate
Methylene Chloride
Mineral Oils
Naphthalene
Nickel Chloride
Nickel Nitrate
Nitric Acid Anhydrous
Nitric Acid 20%
Nitric Acid 40%
Nitric Acid 60%
Nitrobenzene
Nitrous Oxide
Oils and Fats
Oils—Petroleum (See Type)
Oleic Acid
Oxalic Acid
Palmitic Acid 10%
Perchloric Acid 10%
Phenylhydrazine Hydrochloride
Phosgene Gas
Phosphoric Acid—0-25%
Phosphoric Acid—25-50%
Phosphoric Acid—50-85%
Photographic Chemicals
Plating Solutions
Potassium Bicarbonate
Potassium Bichromate
Potassium Borate
Potassium Bromide
Potassium Carbonate
Potassium Chloride
Potassium Chromate
Potassium Cyanide
Potassium Dichromate
Potassium Ferricyanide
Potassium Ferrocyanide
Potassium Fluoride
Potassium Hydroxide
Potassium Nitrate
Potassium Perborate
Potassium Perchlorate
Potassium Permanganate 10%
Potassium Persulfate
Potassium Sulfate
Propane
Propyl Alcohol
Silicic Acid
Silver Cyanide
Silver Nitrate
Silver Plating Solutions
Sodium Acetate
Sodium Arsenite
Sodium Benzoate
Sodium Bicarbonate
Sodium Bisulfate
Sodium Bisulfite
Sodium Bromide
Sodium Chlorate
Sodium Chloride
Sodium Cyanide
Sodium Dichromate
Sodium Ferricyanide
Sodium Ferrocyanide
Sodium Fluoride
Sodium Hydroxide
Sodium Hypochlorite
Sodium Nitrate
Sodium Nitrite
Sodium Sulfate
Sodium Sulfide
Sodium Sulfite
Sodium Thiosulfate (Hypo)
Stannic Chloride
Stannous Chloride
Stearic Acid
Sulfur
Sulfur Dioxide—Gas Dry
Sulfur Trioxide
Sulfuric Acid—0-10%
Sulfuric Acid—10-75%
Sulfuric Acid—75-90%
Sulfurous Acid
Tannic Acid
Tanning Liquors
Tartaric Acid
Titanium Tetrachloride
Triethanolamine
Trimethyl Propanes
Trisodium Phosphate
Turpentine
Urea
Vinegar
Whiskey
White Liquor (Paper Industry)
Wines
Zinc Chloride
Zinc Chromate
Zinc Cyanide
Zinc Nitrate
Zinc Sulfate

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Suggested Format for Specifying Carlon Nonmetallic Conduit, Conduit Fittings and Junction Boxes

A. The Carlon rigid nonmetallic conduit system shall be installed as indicated on the drawings and as specified herein.

B. All wiring shall be installed in Carlon rigid nonmetallic conduit. All conduit shall be secured by means of proper fittings. All fittings shall be Carlon.

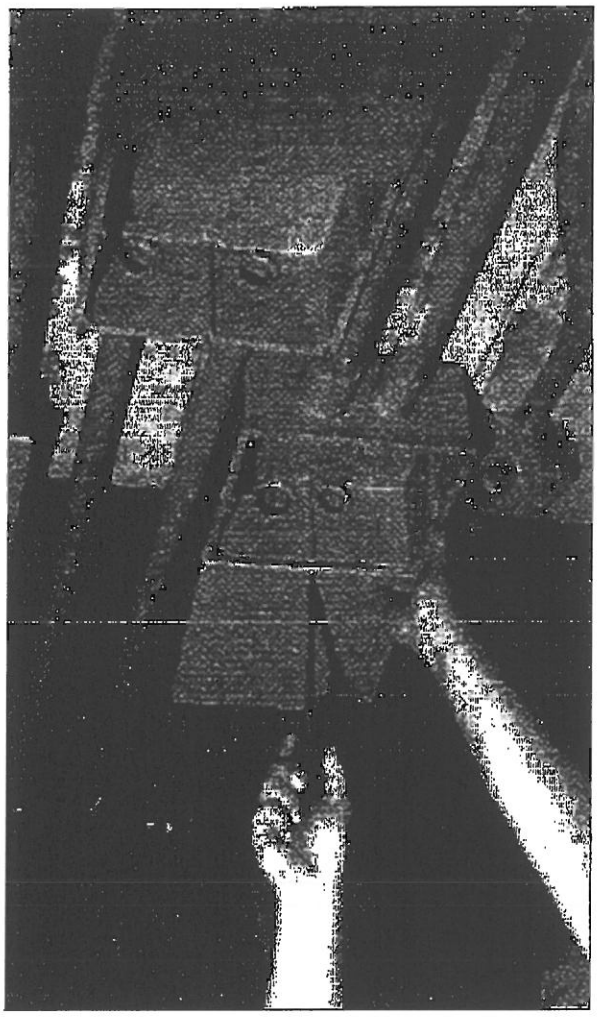
C. Carlon outlet boxes, fittings and junction boxes shall be used for all outlets, pull boxes and junction points. (Lighting fixtures shall not be supported or hung from PVC junction boxes but be supported in position by other means.)

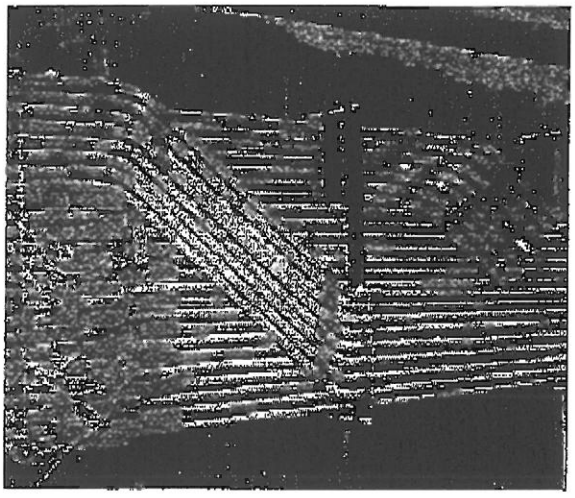
D. Exposed conduits shall be mounted securely by suitable hangers or straps with the maximum spacing of points of supports not greater than indicated by Section 352.30 of the NEC.

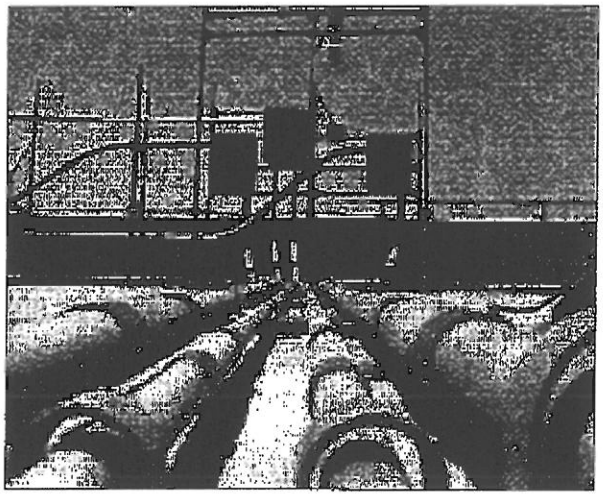
E. Except where embedded in concrete or direct buried, Carlon conduit shall be supported to permit adequate lineal movement to allow for expansion and contraction of conduit due to temperature change.

F. For aboveground installations where temperature change in excess of 14°C (25°F) is anticipated, expansion joints shall be installed. See Table 352.44(A) NEC for expansion characteristics.

G. Proper care shall be taken when field bending is employed to maintain the internal diameter and wall thickness of the conduit.







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Expansion and Contraction

Temperature Considerations for Rigid Nonmetallic Conduit Compensation for Linear Expansion

Like all construction materials, PVC will expand or contract with variations in temperatures. The coefficient of linear expansion in PVC conduit is 3.38×10^{-5} in./in./°F as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion coupling is needed whenever the change in length due to temperature variation will exceed 1/2 in.

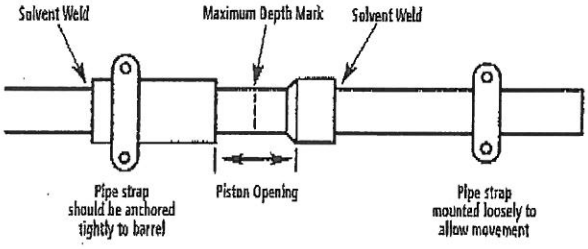
Add 30°F to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

An expansion coupling consists of two sections of conduit, one telescoping inside another. When installing expansion couplings, alignment of piston and barrel is important. Be sure to mount expansion joint level for best performance.

For a vertical run, the expansion coupling must be installed close to the top of the run with the barrel jointing down, in order that rain water does not run into the opening. The lower end of the conduit run must be secured at the bottom so that any length change due to temperature variation will result in an upward movement.

Expansion Characteristics of PVC Rigid Nonmetallic Conduit
Coefficient of Thermal Expansion = 3.38×10^{-5} in./in./°F

Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit
5	0.2	55	2.2	105	4.2	155	6.3
10	0.4	60	2.4	110	4.5	160	6.5
15	0.6	65	2.6	115	4.7	165	6.7
20	0.8	70	2.8	120	4.9	170	6.9
25	1.0	75	3.0	125	5.1	175	7.1
30	1.2	80	3.2	130	5.3	180	7.3
35	1.4	85	3.4	135	5.5	185	7.5
40	1.6	90	3.6	140	5.7	190	7.7
45	1.8	95	3.8	145	5.9	195	7.9
50	2.0	100	4.1	150	6.1	200	8.1



Determine the Piston Opening

The expansion joint must be installed to allow both expansion and contraction of the conduit run. The correct piston opening for any installation condition should use the following formula:

$$O = \left[\frac{T\,max - T\,installed}{\Delta T} \right] E$$

Where:

- O = Piston opening (in.)
- T max = Maximum anticipated temperature of conduit (°F)
- T inst. = Temperature of conduit at time of installation (°F)
- ΔT = Total change in temperature of conduit (°F)
- E = Expansion allowance built into each expansion coupling (in.)

Example

380 ft. of conduit is to be installed on the outside of a building exposed to the sun in a single straight run. It is expected that the conduit will vary in temperature from 0°F in the winter to 140°F in the summer (this includes the 30°F for radiant heating from the sun.) The installation is to be made at a conduit temperature of 90°F. From the table, a 140°F temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is 5.7" x 3.8 = 21.67" which should be rounded to 22". The number of expansion couplings will be 22" x coupling range (4" for Carlon trade sizes 1/2" through 1-1/2", and 8" for sizes 2" through 6".) If the E945D coupling is used, the number will be 22" x 4 = 5.50 which should be rounded to 6. The coupling should be placed at 62 ft. intervals (380 x 6). the proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{140 - 90}{140} \right] 4.0 = 1.4 \text{ in.}$$

Insert the piston into the barrel to the maximum depth. Place a mark on the piston at the end of the barrel. To properly set the piston, pull the piston out of the barrel to correspond to the 2.1 in. calculated above. See drawing at lower left.

Summary

1. Anticipate expansion and contraction of PVC conduit in aboveground, exposed installation.
2. Use an expansion coupling when length change due to temperature variation will exceed 1/2".
3. PVC conduit expands 4.1" for each 100 feet of run and a 100°F temperature change.
4. Align expansion coupling with the conduit run to prevent binding.
5. Follow the instructions to set the piston opening.
6. Rigidly fix the outer barrel of the expansion coupling so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.

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Typical Properties of Conduit Raw Material Compound

Thermal

	ASTM Test	Typical Values
Co-efficient of Thermal Expansion inch/inch/°F (properties @ 73.4°F)	D696	3.38×10^{-5}
Heat Distortion °F at 264 psi	D648	160°F
Thermal Conductivity BTU (hr)(ft.)(°F/in)	N/A	.13

Mechanical

	ASTM Test	Typical Values
Specific Gravity	D792	1.43 – 1.6
Tensile Strength (psi) @ 73.4°F	D638	5,000-6,500
Izod Impact ft lbs/in of notch	D256	0.65 – .5
Flexural Strength (psi)	D790	12,500
Compressive Strength (psi)	D695	9,000
Hardness (Durometer D)	D2240	85

Electrical

	ASTM Test	Typical Values
Dielectrical Strength volts/mil	D149	1400
Dielectric Constant 60 CPS @ 30°C	D150	4.00
Power Factor 60 CPS @ 30°C	D150	.93

Impedance (Volts lost per ampere per 100 feet)

	3∅90% P.F.	80% P.F.	1∅90% P.F.	80% P.F.
Steel Conduit	.0118	.0123	.0136	.0142
Schedule 40®	.0105	.0106	.0121	.0122

Using 250 KCmil Cu. conductor, comparable values for other conductor sizes.

Wire Fill

Maximum number of conductors in Schedule 40 PVC conduit

(Based on Table 1, Chapter 9 of the NEC)

Type Letters	Conductor Size AWG, MCM	Trade Size ½	¾	1	1¼	1½	2	2½	3	3½	4	4¼	5	6	8
THWN	14	15	24	39	69	94	154								
	12	10	18	29	51	79	114	164							
	10	6	11	18	32	44	73	94	160						
	8	3	5	9	15	22	36	51	74	106	136				
THHN	6	1	4	6	11	15	26	37	57	76	98	125	154		
	4	1	2	4	7	9	16	22	35	47	60	75	94	137	236
FEP (14 thru 2)	3	1	1	3	6	8	13	19	29	39	51	64	90	116	201
	2	1	1	3	5	7	11	16	25	33	43	54	67	97	169
FEPB (14 thru 8)	1		1	1	3	5	9	12	18	25	32	49	59	72	125
	1/0			2	4	4	7	10	16	21	27	33	42	61	105
PFA (14 thru 4/0)	2/0			1	3	3	6	8	13	17	22	28	35	51	88
	3/0			1	2	3	5	7	11	14	18	23	29	42	73
PFAH (14 thru 4/0)	4/0			1	2	2	4	6	9	12	15	19	24	35	61
	250			1	1	1	3	4	7	10	12	16	20	28	49
Z (14 thru 4/0)	300			1	1	1	3	4	6	8	11	13	17	24	42
	350			1	1	1	2	3	5	7	9	12	15	21	37
	400				1	1	1	3	5	6	8	10	13	19	33
XHHW (4 thru 500MCM)	500				1	1	1	2	4	5	7	9	11	16	27
	600				1	1	1	1	3	4	5	7	9	13	22
	700					1	1	1	3	4	5	6	8	11	19
	750					1	1	1	2	3	4	6	7	11	19
XHHW	6	1	3	5	9	13	21	30	47	63	81	102	128	185	320
	600				1	1	1	1	3	4	5	7	9	13	22
	700					1	1	1	3	4	5	6	7	11	19
	750					1	1	1	2	3	4	6	7	10	18

Maximum number of conductors in Schedule 80 PVC conduit

(Based on Table 1, Chapter 9 of the NEC)

Conductor Size AWG, MCM		Trade Size ½	¾	1	1¼	1½	2	2½	3	4	5
14	THW	4	8	13	24	34	57	82	128		
	THHN	10	19	33	58	81	135	194	0		
12	THW	3	6	11	20	28	47	67	105	185	
	THHN	8	14	24	43	60	100	144	0		
10	THW	3	5	9	16	22	37	54	85	148	
	THHN	5	9	15	27	38	64	92	143		
8	THW	1	2	4	8	11	19	28	44	77	121
	THHN	1	4	7	13	18	31	45	70	123	195
6	THW	1	1	3	5	8	14	20	32	56	88
	THHN	1	3	5	9	13	22	32	50	88	140
4	THW	1	1	2	4	6	10	15	24	42	66
	THHN	1	1	3	6	8	13	20	31	54	86
3	THW	1	1	1	3	5	9	13	20	36	57
	THHN	1	1	2	5	7	11	17	26	46	73
2	THW	1	1	1	2	4	8	11	17	31	49
	THHN	1	1	1	4	5	9	14	22	38	61
1	THW	0	1	1	1	3	5	8	13	22	35
	THHN	0	1	1	3	4	7	10	16	28	45
0	THW	0	0	1	1	2	4	7	11	19	30
	THHN	0	1	1	2	3	6	8	13	24	38
00	THW	0	0	1	1	1	3	6	9	16	26
	THHN	0	1	1	1	3	5	7	11	20	32
000	THW	0	0	0	1	1	2	5	8	14	22
	THHN	0	0	1	1	2	4	6	9	16	26
0000	THW	0	0	0	1	1	2	4	7	11	18
	THHN	0	0	1	1	1	3	5	8	14	22
250	THW	0	0	0	1	1	1	3	5	9	14
	THHN	0	0	0	1	1	2	4	6	11	18
300	THW	0	0	0	1	1	1	3	4	8	13
	THHN	0	0	0	1	1	1	3	5	9	15
350	THW	0	0	0	1	1	1	2	4	7	11
	THHN	0	0	0	1	1	1	3	4	8	13
400	THW	0	0	0	0	1	1	1	3	6	10
	THHN	0	0	0	1	1	1	2	4	7	12
500	THW	0	0	0	0	1	1	1	3	5	8
	THHN	0	0	0	0	1	1	1	3	6	10
600	THW	0	0	0	0	0	1	1	1	4	7
	THHN	0	0	0	0	1	1	1	3	5	8
700	THW	0	0	0	0	0	1	1	1	3	6

Weight Comparison

Carlon Schedule 40® rigid nonmetallic conduit compared to other rigid conduit in pounds per 100 feet (approx.)

Nom. Size	Carlon Schedule 40® Rigid Nonmetallic Conduit	Carlon Schedule 80® Rigid Nonmetallic Conduit	Aluminum	Electrical Metallic Tubing (EMT)	Intermediate Metal Conduit (IMC)	Rigid Metal Conduit (RMC)
½	18	22	27	30	57	79
¾	23	29	36	46	78	105
1	35	43	53	66	132	153
1¼	48	60	70	96	114	201
1½	57	72	86	112	176	246
2	76	100	116	142	230	334
2½	125	153	183	230	393	527
3	164	212	239	270	483	690
3½	198	248	288	350	561	831
4	234	310	340	400	625	982
5	317	431	465	Not Made	Not Made	1344
6	412	592	612	Not Made	Not Made	1770

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Schedule 80 PVC Rigid Nonmetallic Conduit (RNC)

(Extra Heavy Wall EPC-80)

ETL Listed to UL 651 in compliance to the NEC

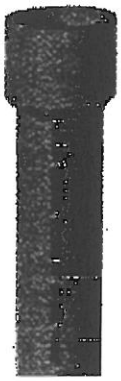
UL LISTED E35297

RUS Listed

Listed for use in aboveground and belowground applications that are subject to physical damage.

- Sunlight resistant • Rated for use with 90°C conductors • Superior weathering characteristics
- For use in areas subject to physical damage

With Integral Bell*



Schedule 80 Extra Heavy Wall

Part No. 10'	Part No. 20'	Nom. Size	Std. Crate Qty. 10'	Std. Crate Qty. 20'	Wt. Per 100'	Dimensions O.D.	Dimensions I.D.	Wall
49405-010	49405-020	1/2"	6000'	12000'	21	.840	.546	.147
49407-010	49407-020	3/4"	4400'	8000'	30	1.050	.742	.154
49408-010	49408-020	1"	3600'	7200'	44	1.315	.957	.179
49409-010	49409-020	1 1/4"	3300'	6600'	60	1.660	1.278	.191
49410-010	49410-020	1 1/2"	2250'	3600'	72	1.900	1.500	.200
49411-010	49411-020	2"	1400'	2800'	101	2.375	1.939	.218
49412-010	49412-020	2 1/2"	930'	1880'	154	2.875	2.323	.276
49413-010	49413-020	3"	880'	1760'	210	3.500	2.900	.300
49415-010	49415-020	4"	570'	1140'	308	4.500	3.826	.337
49416-010	–	5"	380'	–	428	5.563	4.813	.375
49417-010	49417-020	6"	260'	520'	588	6.625	5.761	.432

Rigid nonmetallic conduit is normally supplied in standard 10' lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10', with or without belled ends.

Use RNC Fittings with Schedule 40 and Schedule 80 Conduit.

Notes: 1. Special fittings and conduit sizes will be quoted on request.
2. DON'T FORGET TO ORDER CEMENT.
3. Carlon reserves the right to ship to the nearest unitized quantity.

Support of Carlon Rigid Nonmetallic Conduit in Aboveground Installations

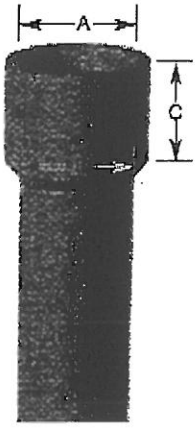
Table 352.30(B) NEC shows the support requirements for Schedule 40 and Schedule 80 rigid PVC nonmetallic conduit.

Plastic conduit should always be installed away from steam lines, etc. Support straps should allow for lineal movement caused by expansion and contraction.

Maximum ambient temperature is 122°F (50°C).

Table 352.30(B), NEC

Trade Size	Maximum Spacing Between Supports (feet)
1/2 - 1	3
1 1/4 - 2	5
2 1/2 - 3	6
3 1/2 - 5	7
6	8



Acceptable Dimensions in Inches of Integral Bell per UL 651

Trade Size	A At Entrance (in.) Maximum	A At Entrance (in.) Minimum	B At Bottom (in.) Maximum	B At Bottom (in.) Minimum	C Nominal Bell Depth (in.)
1/2	0.860	0.844	0.844	0.828	1.375
3/4	1.074	1.054	1.056	1.036	1.500
1	1.340	1.320	1.320	1.300	1.750
1 1/4	1.689	1.665	1.667	1.643	1.875
1 1/2	1.930	1.906	1.906	1.882	2.750
2	2.405	2.381	2.381	2.357	3.250
2 1/2	2.905	2.875	2.883	2.853	3.250
3	3.530	3.500	3.507	3.477	3.875
3 1/2	4.065	3.965	4.007	3.977	3.875
4	4.565	4.465	4.506	4.476	4.625
5	5.643	5.543	5.583	5.523	5.625
6	6.708	6.608	6.644	6.584	6.375

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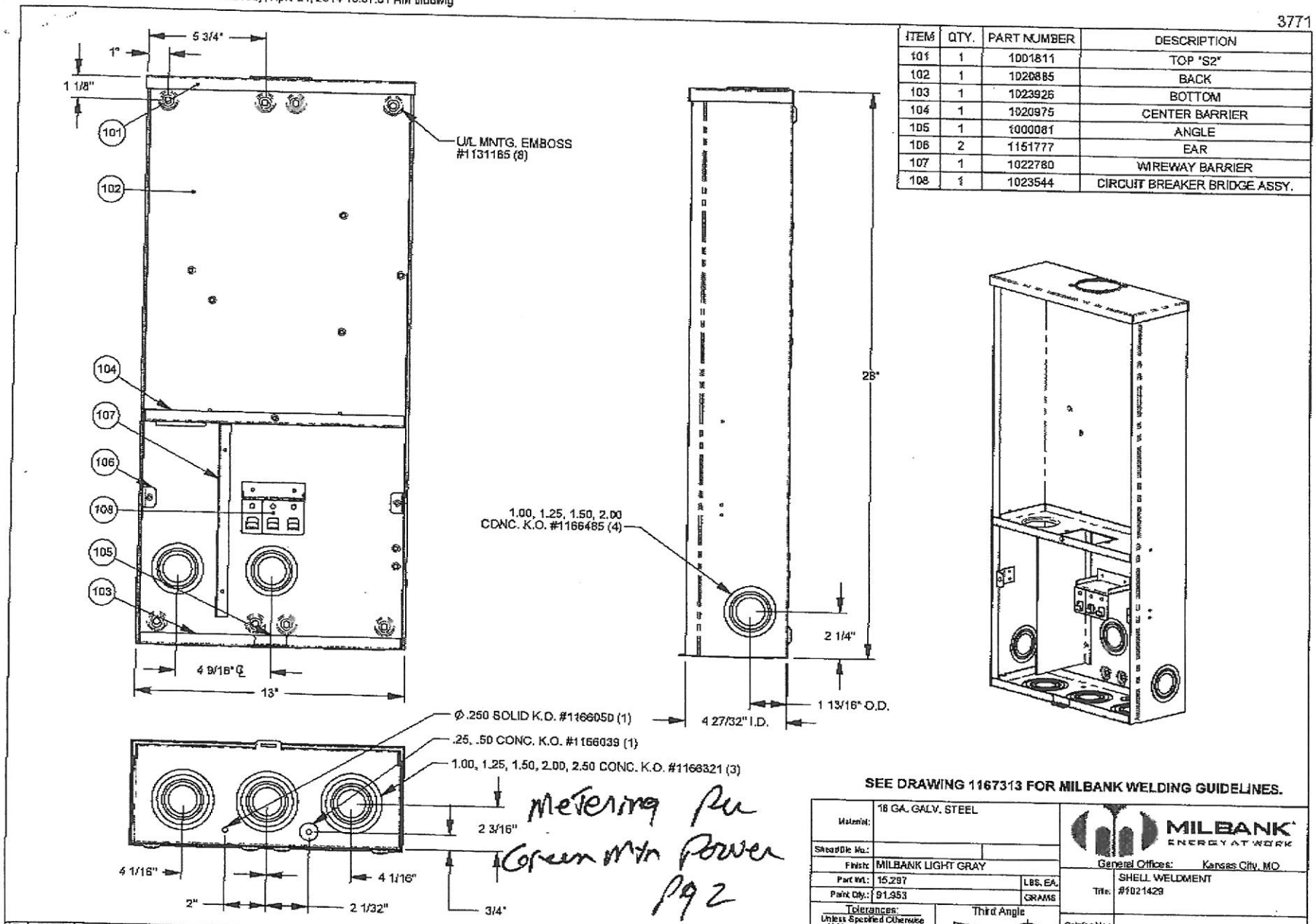
Thursday, April 24, 2014 10:37:01 AM bludwig

3771

ITEM	QTY.	PART NUMBER	DESCRIPTION
101	1	1001811	TOP "S2"
102	1	1020885	BACK
103	1	1023926	BOTTOM
104	1	1020975	CENTER BARRIER
105	1	1000081	ANGLE
106	2	1151777	EAR
107	1	1022780	WIREWAY BARRIER
108	1	1023544	CIRCUIT BREAKER BRIDGE ASSY.



SEE DRAWING 1167313 FOR MILBANK WELDING GUIDELINES.

Material:	16 GA. GALV. STEEL
Sheet/Die No.:	
Finish:	MILBANK LIGHT GRAY
Part Wt.:	15.297 LBS. EA.
Paint Qty.:	91.953 GRAMS
Tolerances: Unless Specified Otherwise	X.X ±.1; X.XX ±.08; X.XXX ±.015; X° ±2°
Third Angle	
Scale:	NTS
Drawn By:	BL
Checked By:	
Approved By:	

MILBANK ENERGY AT WORK

General Offices: Kansas City, MO

Title: SHELL WELDMENT #1021429

Catalog No.:

Customer:

Drawing No.: 3771

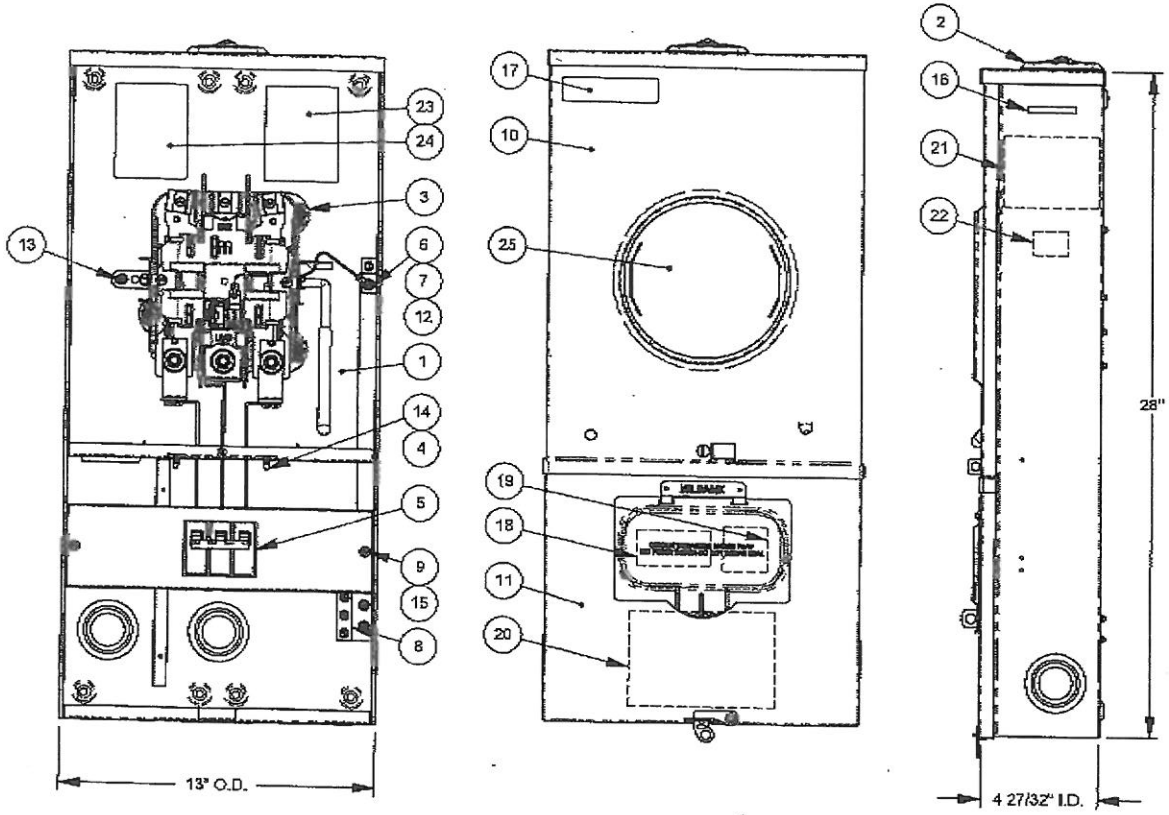
Date: 4/24/14 Sheet: 2 of 2

REV	DATE	DESCRIPTION	ECO No.	BY
D3	4/24/14	REDRAWN IN SOLIDWORKS; UPDATED LABEL PLACEMENT; ADDED SHELL WELDMENT DETAIL	25203	BL

Thursday, April 24, 2014 10:37:01 AM bludwig

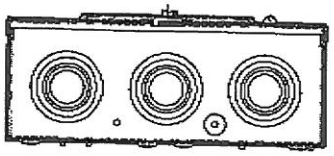
3771

SUFFIX	CIRCUIT BREAKER
-100	1008152
-30	1098956
-25	1124151



ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	1021429	SHELL WELDMENT
2	1	(SEE CHART)	CLOSING PLATE ASSY.
3	1	1028270	100A RINGLESS 7T BYPASS, 2/0
4	1	1022747	SUPPORT FIBER
5	1	SEE CHART	3P CIRCUIT BREAKER
6	1	1032327	BUS
7	1	1000199	CONNECTOR 1/0, 1 POS.
8	1	1026583	1/0 CONNECTOR ASSY
9	1	1022778	DEAD FRONT
10	1	1119946	FRONT ASSY
11	1	1108879	FRONT ASSY
12	6	1123646	SCREW 12-24 X 9/16 HX ST
13	1	1000183	SCREW 12-24 x 5/16
14	2	1028184	PLASTIC PLUG
15	2	1001290	SCREW, 10-32 X 5/16
16	1	N/A	STAMP CAT. NO.
17	1	1000064	LABEL, WARNING
18	1	1025112	LABEL SERVICE DISCONNECT
19	1	1025027	LABEL, ON/OFF TRIP
20	1	1025219	LABEL, WIRE RATING
21	1	1022210	LABEL, METER MAIN, SERIES WCMM
22	1	1025144	U.L. LABEL
23	1	1001272	LABEL, BY-PASS INSTR. (LOC. B)
24	1	1032465	WIRING DIAGRAM LABEL
25	1	1000158	WIREMAN PAD
26	1	1106914	CARTON 1-PER (NOT SHOWN)

CAT. NO. SUFFIX		
SUFFIX	SMALL HUB OPENING	
-XL	CLOSING PLATE	#1028222
-RL	HUB OPENING	#NONE
-WL	1"	# HUB W
-YL	1 1/4"	# HUB Y
-ZL	1 1/2"	# HUB Z
-DL	2"	# HUB D
-EL	2 1/2"	# HUB E



METERING Per Green Mtn Power Pg 1

SEE SHEET 2 FOR SHELL WELDMENT DETAIL

Material:	16 GA. GALV. STEEL
Shear/Die No.:	
Finish:	MILBANK LIGHT GRAY
Part Wt.:	LBS. EA.
Paint Qty.:	GRAMS

Tolerances: Unless Specified Otherwise
X.X ±.1
X.XX ±.03
X.XXX ±.015
X° ±2°

Third Angle

Scale:	NTS	Checked By:	
Drawn By:	BL	Approved By:	

MILBANK ENERGY AT WORK
KANSAS CITY, MO, USA

Title:	100A OH UG RINGLESS 7T 2/0 METER MAIN
Catalog No.:	U3771-( )
Customer:	
Drawing No.:	3771
Date:	4/24/14
Sheet:	1 of 2

REV.	DATE	DESCRIPTION	ECO No.	BY
03	4/24/14	REDRAWN IN SOLIDWORKS; UPDATED LABEL PLACEMENT; ADDED SHELL WELDMENT DETAIL	25203	BL

ABB Drive

Technical data and types

IP20 UL open

Ratings P_N kW	Ratings P_N hp	Ratings I_{2N} A	Type designation	Frame size	IP20 UL open H2 mm	IP20 UL open W mm	IP20 UL open D mm	IP20 UL open Weight kg
1-phase AC supply, 200 to 240 V								
0.37	0.5	2.4	ACS355-01X-02A4-2	R0	202	70	161	1.1
0.75	1	4.7	ACS355-01X-04A7-2	R1	202	70	161	1.3
1.1	1.5	6.7	ACS355-01X-06A7-2	R1	202	70	161	1.3
1.5	2	7.5	ACS355-01X-07A5-2	R2	202	105	165	1.5
2.2	3	9.8	ACS355-01X-09A8-2	R2	202	105	165	1.6
3-phase AC supply, 200 to 240 V								
0.37	0.5	2.4	ACS355-03X-02A4-2	R0	202	70	161	1.1
0.55	0.75	3.5	ACS355-03X-03A5-2	R0	202	70	161	1.1
0.75	1	4.7	ACS355-03X-04A7-2	R1	202	70	161	1.3
1.1	1.5	6.7	ACS355-03X-06A7-2	R1	202	70	161	1.3
1.5	2	7.5	ACS355-03X-07A5-2	R1	202	70	161	1.3
2.2	3	9.8	ACS355-03X-09A8-2	R2	202	105	165	1.5
3	4	13.3	ACS355-03X-13A3-2	R2	202	105	165	1.5
4	5	17.6	ACS355-03X-17A6-2	R2	202	105	165	1.5
5.5	7.5	24.4	ACS355-03X-24A4-2	R3	202	169	169	2.5
7.5	10	31	ACS355-03X-31A0-2	R4	202	260	169	4.4
11	15	46.2	ACS355-03X-46A2-2	R4	202	260	169	4.4
3-phase AC supply, 380 to 480 V								
0.37	0.5	1.2	ACS355-03X-01A2-4	R0	202	70	161	1.1
0.55	0.75	1.9	ACS355-03X-01A9-4	R0	202	70	161	1.1
0.75	1	2.4	ACS355-03X-02A4-4	R1	202	70	161	1.3
1.1	1.5	3.3	ACS355-03X-03A3-4	R1	202	70	161	1.3
1.5	2	4.1	ACS355-03X-04A1-4	R1	202	70	161	1.3
2.2	3	5.6	ACS355-03X-05A6-4	R1	202	70	161	1.3
3	4	7.3	ACS355-03X-07A3-4	R1	202	70	161	1.3
4	5	8.8	ACS355-03X-08A8-4	R1	202	70	161	1.3
5.5	7.5	12.5	ACS355-03X-12A5-4	R3	202	169	169	2.5
7.5	10	15.6	ACS355-03X-15A6-4	R3	202	169	169	2.5
11	15	23.1	ACS355-03X-23A1-4	R3	202	169	169	2.5
15	20	31	ACS355-03X-31A0-4	R4	202	260	169	4.4
18.5	25	38	ACS355-03X-38A0-4	R4	202	260	169	4.4
22	30	44	ACS355-03X-44A0-4	R4	202	260	169	4.4

IP66/IP67/UL Type 4X

Ratings P_N kW	Ratings P_N hp	Ratings I_{2N} A	Type designation	Frame size	IP66/IP67/UL Type 4X H mm	IP66/IP67/UL Type 4X W mm	IP66/IP67/UL Type 4X D mm	IP66/IP67/UL Type 4X Weight kg
3-phase AC supply, 200 to 240 V								
0.37	0.5	2.4	ACS355-03X-02A4-2 + B063	R1	305	195	281	7.7
0.55	0.75	3.5	ACS355-03X-03A5-2 + B063	R1	305	195	281	7.7
0.75	1	4.7	ACS355-03X-04A7-2 + B063	R1	305	195	281	7.7
1.1	1.5	6.7	ACS355-03X-06A7-2 + B063	R1	305	195	281	7.7
1.5	2	7.5	ACS355-03X-07A5-2 + B063	R1	305	195	281	7.7
2.2	3	9.8	ACS355-03X-09A8-2 + B063	R3	436	246	277	13
3	4	13.3	ACS355-03X-13A3-2 + B063	R3	436	246	277	13
4	5	17.6	ACS355-03X-17A6-2 + B063	R3	436	246	277	13
3-phase AC supply, 380 to 480 V								
0.37	0.5	1.2	ACS355-03X-01A2-4 + B063	R1	305	195	281	7.7
0.55	0.75	1.9	ACS355-03X-01A9-4 + B063	R1	305	195	281	7.7
0.75	1	2.4	ACS355-03X-02A4-4 + B063	R1	305	195	281	7.7
1.1	1.5	3.3	ACS355-03X-03A3-4 + B063	R1	305	195	281	7.7
1.5	2	4.1	ACS355-03X-04A1-4 + B063	R1	305	195	281	7.7
2.2	3	5.6	ACS355-03X-05A6-4 + B063	R1	305	195	281	7.7
3	4	7.3	ACS355-03X-07A3-4 + B063	R1	305	195	281	7.7
4	5	8.8	ACS355-03X-08A8-4 + B063	R1	305	195	281	7.7
5.5	7.5	12.5	ACS355-03X-12A5-4 + B063	R3	436	246	277	13
7.5	10	15.6	ACS355-03X-15A6-4 + B063	R3	436	246	277	13

X within the type code stands for E or U.
E = EMC filter connected, U = EMC filter disconnected.
+2 = Height with feetelings but without clamping clats.
H = Height, W = Width, D = Depth
B063 = IP66/IP67/UL Type 4X enclosure

Mains connection	
Voltage and power connection	1-phase, 200 to 240 V ±10%: 0.37 to 2.2 kW (0.5 to 3 hp) 3-phase, 200 to 240 V ±10%: 0.37 to 11 kW (0.5 to 15 hp) 3-phase, 380 to 480 V ±10%: 0.37 to 22 kW (0.5 to 10 hp)
Frequency	48 to 63 Hz
Motor connection	
Voltage	3-phase, from 0 to U_{supply}
Frequency	0 to 599 Hz
Overload capacity	1.5 x I_{2N} for 1 minute every 10 minutes At start 1.8 x I_{2N} for 2 seconds
Switching frequency	4 (default) to16 kHz with 4 kHz steps
Parameter-enabled noise cancellation function	
Programmable control connections	
Two analog inputs, signal selectable	
Voltage signal	± 10 V, 0 (2) to 10 V
Current signal	±20 mA, 0 (4) to 20 mA
One analog output	0 (4) to 20 mA
Five digital inputs	12 to 24 V, PNP and NPN, programmable DI5 0 to 16 kHz pulse train
One relay output	NO + NC, 250 V AC/2 A, 30 V DC/0.5 A
One digital output	Transistor output, 30 V DC/100 mA, programmable 10 Hz to 16 kHz pulse train
Accuracy	24 V DC ±10%, max. 200 mA
Environmental limits	
Ambient temperature	-10 to 40 °C (14 to 104 °F), no frost allowed 50 °C (122 °F) with 10% derating
Relative humidity	Lower than 96% (without condensation)

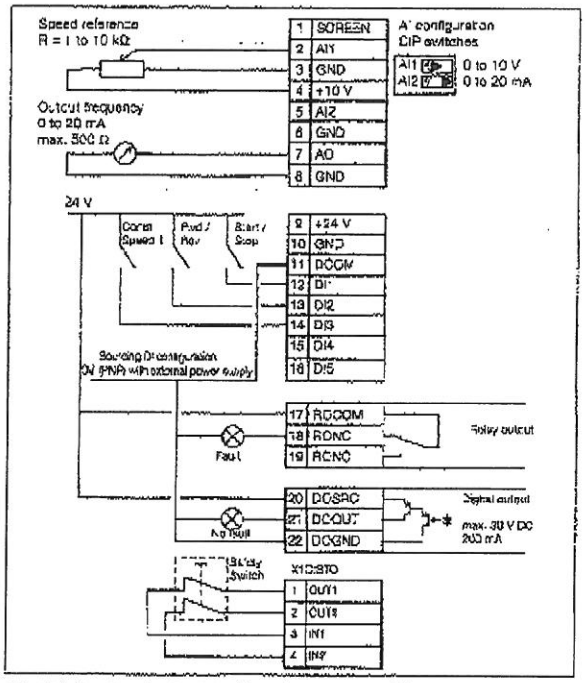


Figure 1. Inputs and outputs configuration based on ABB standard macro and external digital input supply voltage.

For more information please contact your local ABB representative or visit:

www.abb.com/drives
www.abb.com/drivespartners

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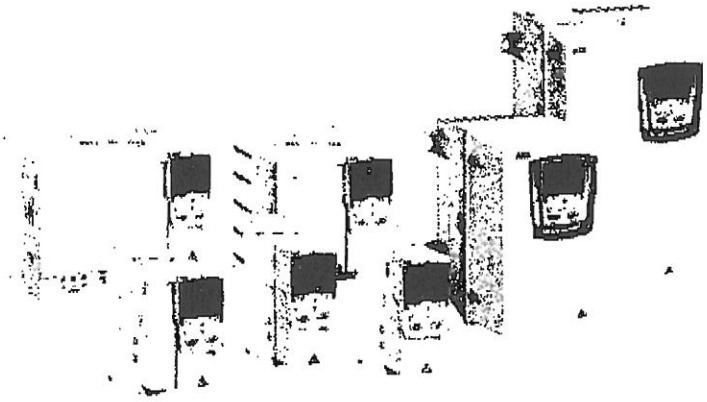
3AUA0000085578 REV B EN 27.3.2013 #16747

ABB Drive

ABB machinery drives
ACS355, 0.37 to 22 kW / 0.5 to 30 hp

The ABB machinery drives are designed to be fast drives to install, parameter-set and commission. Thus saving hours of engineering work. They are highly compact and cost effective and equipped with cutting-edge intelligence and an innovative safety capability. The drives are designed specifically to meet the production and performance needs of system integrators, original equipment manufacturers (OEMs) and panel builders, as well as the requirements of end users in a broad range of applications.



Highlights
- Worldwide availability and service
- Exceptionally compact drives and uniform design
- Quick commissioning with application macros and panel assistants
- Safe torque-off function (SIL3) as standard
- Sensorless vector control for induction and permanent magnet motors
- Built-in brake chopper
- High protection class variants for demanding environments

Saving time in installation and commissioning
The drive's compact and uniform dimensions facilitate multiple drive solutions and cabinet installations. Different mounting options enable flexible installation in restricted spaces.

With the FlashDrop tool the drive can be pre-configured in seconds without powering the drive. The drive's application macros and assistants enable fast and easy commissioning.

Saving cost with cutting-edge intelligence and flexibility
Up to eight pre-set sequences of operations can be created in minutes with the drive's PC tool to reduce the need for external PLC components. Versatile fieldbus connectivity to most PLCs on the market is also available. The drive includes Safe torque-off function as standard helping machine builders to fulfill the latest machinery directives.

Additional features include Speed Compensated Stop. This makes the drive ideal for material handling applications that require precision stopping that is independent of variations in process speed. For demanding environments high protection class variants are available in IP66/IP67/UL Type 4X classes that are NSF certified.

Power and voltage range
- 1-phase, 200 to 240 V ± 10% 0.37 to 2.2 kW (0.5 to 3 hp)
- 3-phase, 200 to 240 V ± 10% 0.37 to 11 kW (0.5 to 15 hp)
- 3-phase, 380 to 480 V ± 10% 0.37 to 22 kW (0.5 to 30 hp)

Options
- Auxiliary I/O modules
  - MTAC pulse encoder interface
  - MREL module for additional relays
  - MPOW for external auxiliary power supply
- Fieldbus connection via optional modules
  - PROFIBUS DP
  - CANopen®
  - DeviceNet™
  - Modbus
  - Ethernet
  - Profinet
  - EtherCAT®
  - LonWorks®
- FlashDrop tool for fast pre-configuration without powering the drive
- DriveWindow Light PC tool for easy parameter setting and graphical sequence programming
- External EMC filters for category C2 compatibility
- Input chokes for IEC 61000-3-12 compatibility