

# Homefield

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ENGINEERING DEPARTMENT

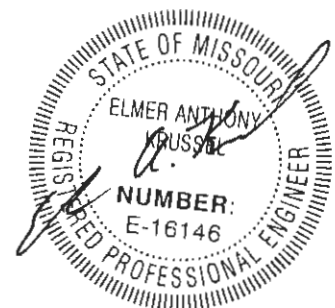
## Pump Station Design Report

Prepared for:  
Summit Pointe, L.C.  
239 Fox Hill Road  
St. Charles, Missouri 63301  
(636) 940-9300

Prepared by:  
Pickett, Ray & Silver, Inc.  
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St. Peters, MO 63376  
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November, 2002  
Revised February 2003  
Revised March 2003  
Appended April 2003

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4/24/03  
APPROVED as Noted  
*[Signature]*



4/18/03

## GENERAL

Homefield is a residential development located on the south side of Old Highway 79, west of Highway 79 in O'Fallon, Missouri. A total of 444 residential units are planned in Homefield.

Sanitary sewers from Homefield will drain to a proposed sanitary pump station on the south side of Old Highway 79 near the northwest corner of Village Y. Sewage will be pumped through a 6-inch force main westwardly to an existing manhole in Highgrove Plat One.

The pump station will be designed to serve additional property between Old Highway 79 and Highway 79. Approximately 18 acres could drain to the pump station. Assuming three homes per acre, a total of 54 homes could drain to the pump station.

## PUMP STATION DESIGN CALCULATIONS

Homefield

$$\text{Population Equivalent } P_e = 444 \text{ homes} \times 3.7 \text{ people/home} = 1,643$$

$$\text{Average Domestic Flow } F = P_e \times 100 \text{ gal/person/day} = 164,300 \text{ gal/day}$$

$$\begin{aligned} \text{Infiltration } I &= (200 \text{ gal/in. diam/mile/day}) \times \text{pipe diameter (in)} \times \text{length (mile)} \\ I &= (200 \times 8 \times 4.16) + (200 \times 10 \times 0.95) = 8,556 \text{ gpd} \end{aligned}$$

$$\begin{aligned} \text{Average Daily Flow } ADF &= F + I = 164,300 + 8,556 = 172,856 \text{ gal/day} \\ ADF \text{ (GPM)} &= 172,856 \text{ gal/day} / 1,440 \text{ min/day} = 120.04 \text{ gal/min} \end{aligned}$$

$$\begin{aligned} \text{Peak Daily Flow } PDF &= 2.5 \times ADF \\ PDF &= 2.5 \times 172,856 = 432,140 \text{ gal/day} \\ PDF \text{ (GPM)} &= 2.5 \times 120.04 = 300.10 \text{ gal/min} \end{aligned}$$

Offsite

$$\text{Population Equivalent } P_e = 54 \text{ homes} \times 3.7 \text{ people/home} = 200$$

$$\text{Average Domestic Flow } F = P_e \times 100 \text{ gal/person/day} = 20,000 \text{ gal/day}$$

$$\begin{aligned} \text{Infiltration} &\text{ – assume 0.5 miles – 8" sanitary sewer} \\ I &= 200 \times 8 \times 0.5 = 800 \text{ gpd} \end{aligned}$$

$$\begin{aligned} \text{Average Daily Flow } ADF &= F + I = 20,000 + 800 = 20,800 \text{ gal/day} \\ ADF \text{ (GPM)} &= 20,800 \text{ gal/day} / 1,440 \text{ min/day} = 14.44 \text{ gal/min} \end{aligned}$$

Peak Daily Flow PDF = 2.5 x ADF  
 PDF = 2.5 x 20,800 = 52,000 gal/day  
 PDF (GPM) = 2.5 x 14.44 = 36.11 gal/min

**Total**  
 ADF = 172,856 + 20,800 = 193,656 gal/day  
 ADF (GPM) = 120.04 + 14.44 = 134.48 gal/min  
 PDF = 432,140 + 52,000 = 484,140 gal/day  
 ADF (GPM) = 300.10 + 36.11 = 336.21 gal/min

**Total Dynamic Head TDH**

**Static Head H<sub>s</sub>**

Maximum Force Main Elevation =	501.2
Pump Off Elevation	- 442.0
H <sub>s</sub>	59.2

**Friction Losses**

Equivalent Pipe Length  
 Station 4" DIP 4.00" inside diameter

90° Elbow	2	Each	@	11'	=	22'
Tee	1	Each	@	22'	=	22'
Gate Valve	1	Each	@	2'	=	2'
Check Valve	1	Each	@	31'	=	31'
Pipe Length					=	29'
Station Length					=	106 Lin. Ft. – 4" DIP

**Force Main 6" PVC 6.134" inside diameter**

Pipe Length					=	1530'
45° Elbow	6	Each	@	7.5'	=	45'
Force Main Length					=	1575 Lin. Ft. – 6" PVC

**Hazen Williams friction loss formula**

Friction head loss (feet per 100' pipe) =  $0.2083 \times (100/c)^{1.85} \times Q^{1.85}/d^{4.8655}$

Where: C = friction factor = 120 for PVC or DIP

Q = flow in gal/min

D = pipe diameter inches

Friction loss in Station L<sub>s</sub> = Station Length x Friction Factor /100

Friction loss in Force Main L<sub>f</sub> = Factor Main Length x Friction Factor/100

Q (gpm)	L <sub>f</sub> (ft.)	L <sub>s</sub> (ft.)	Head (ft.)	TDH (ft.)	Velocity (ft./sec.)
250	9.40	5.06	59.2	73.7	2.71
300	13.16	7.10	59.2	79.5	3.26
350	17.51	9.44	59.2	86.15	3.80
400	22.41	12.08	59.2	93.7	4.34
450	27.87	15.02	59.2	102.1	4.89
500	33.87	18.25	59.2	111.3	5.43

## CYCLE TIMES

ABS Model AFP 1049 pump, 342 gpm

Pump on Elev 445.0

Pump off Elev 442.0

Fill Volume = 3' x 6' x 6' x 7.481 gal/cu ft = 808 gal

Cycle Time for ADF

Time to Fill = 808 gal/134.48 gpm = 6.01 min

Pump Time = 808 gal/(342-134.48) gpm = 3.89 min

Pump Off = 2 x 6.01 min + 3.89 min = 15.91 min

Cycle Time for PDF

Time to Fill = 808 gal/336.21 gpm = 2.40 min

Pump time = 808 gal/(342 - 336.21) gpm = 139.55 min

Pump Off = 2 x 2.40 min + 139.55 min = 144.35 min

Standby Generator

A diesel-powered standby generator will be installed to supply power to the pump station in the event of a power outage.

# **BUOYANCY CALCULATIONS**

## Wetwell

### Weight of Structure

Base: 9'-8" x 9'-8" x 1'-0" @ 150 lb/cu ft	=	14,017 lb
Walls: 4 x 6'-10" x 23.3' x 10" @ 150 lb/cu ft	=	79,608 lb
Soil over base: 4 x 8'-8" x 23.3' x 1' @ 120 lb/cu ft	=	<u>96,928 lb</u>

<b>Total</b>	<b>=</b>	<b>190,553 lb</b>
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### Weight of displaced water

9'-8" x 9'-8" x 24.3' @ 62.4 lb/cu ft	=	141,692 lb
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**Pump performance curves**  
**AFP 1049 60 HZ**

Curve number
Reference curve AFP 1049
Frequency 60 Hz
Date 2003-04-17

O'Fallon, MO - Homefield

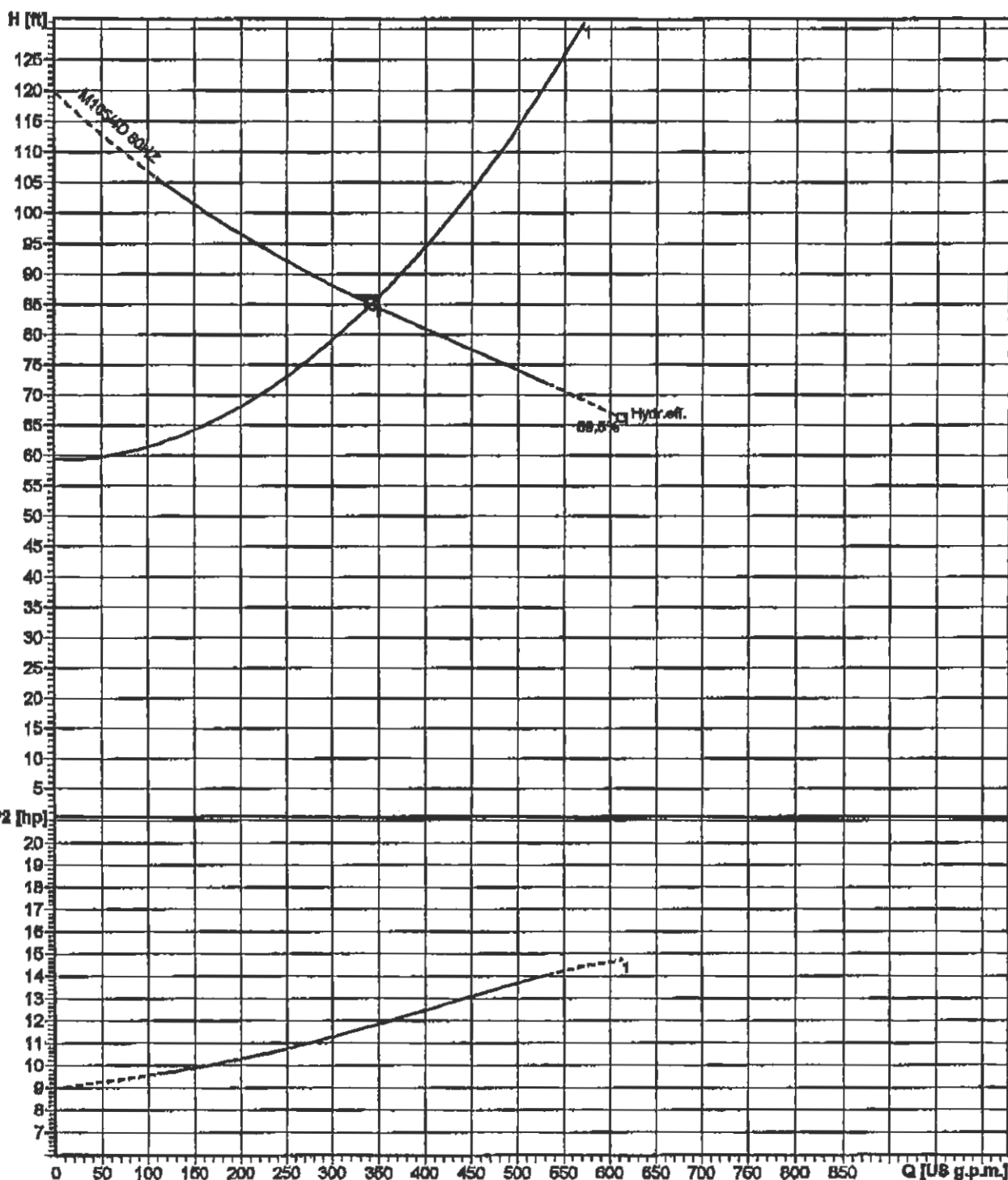
Discharge  
DN100

Density  
62.43 lbm/ft<sup>3</sup>

Viscosity  
0.0000169 ft<sup>2</sup>/s

Testnorm  
Hydraulic Institute

Rated speed  
1735 rpm



Impeller size 9.96 Inch	N° of vanes 1	Impeller ContraBlock Impeller, 1 vane	Stator size 3"	Revision 2001-08-28
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ABS reserves the right to change any data and dimensions without prior notice and can not be held responsible for the use of information contained in this software.

ABSEL 1.51 / 2001-11-12

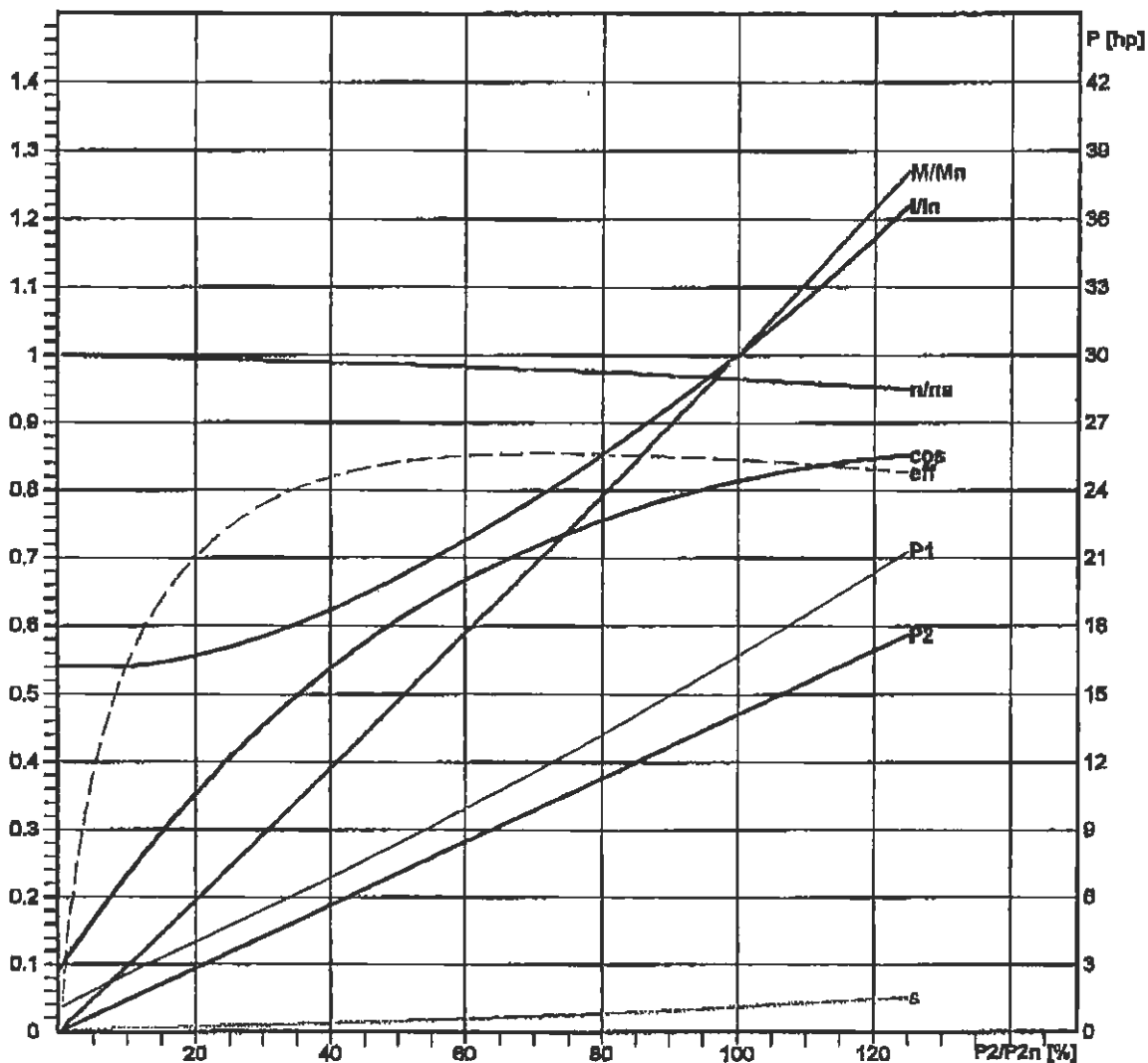


**Motor performance curve**  
**M105/4D 60HZ**

Frequency  
60 Hz

O'Fallon, MO - Hornfield

Rated power 14.1 hp	Service factor	Nominal speed 1735 rpm	Number of poles 4	Rated voltage 460 V	Date 2003-04-17
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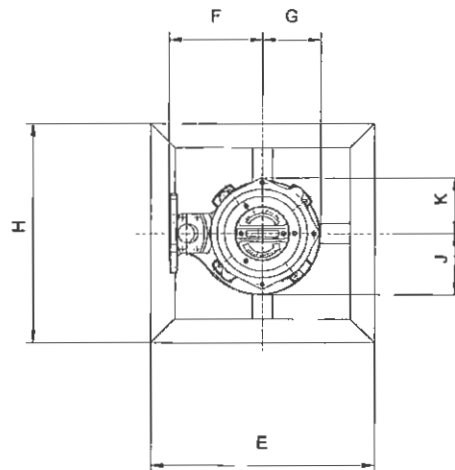
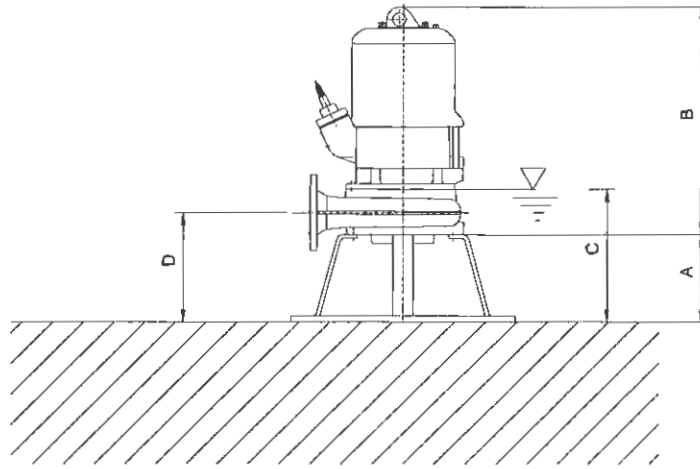
Loading	No load	25 %	60 %	75 %	100 %	125 %
P1 [hp]	1.023	4.710	8.373	12.37	16.67	21.3
P2 [hp]	0	3.52	7.04	10.56	14.08	17.6
I [A]	10.4	10.91	12.88	15.72	19.19	23.4
eff [%]	0	74.8	84.08	85.38	84.45	82.62
cos	0.08204	0.4048	0.6084	0.7388	0.8132	0.852
n [rpm]	1799	1788	1774	1757	1735	1709
M [lbf ft]	0	10.36	20.85	31.57	42.63	54.09
s [%]	0.05666	0.7723	1.455	2.378	3.617	5.054

Tolerance according to VDE 0630 T1 12.84 for rated power

Starting current 110 A	Starting torque 95.9 lbf ft	Moment of Inertia	
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**AFP 1049 60 HZ**



Wet well stationary with pedestal

**Dimensions [Inch]**

A	B	C	D	E	F	G	H	J	K
8 <sup>9</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>4</sub>	23 <sup>13</sup> / <sub>16</sub>	11	7 <sup>5</sup> / <sub>8</sub>	23 <sup>13</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>4</sub>





# PERFORMANCE CURVE

PRODUCT  
**NS3153.180**

TYPE  
**HT**

DATE  
**2003-03-19**

PROJECT

CURVE NO  
**63-455-00-6050**

ISSUE  
**1**

	1/1-LOAD	3/4-LOAD	1/2-LOAD		
POWER FACTOR	0.81	0.74	0.62	RATED POWER .....	18 hp
EFFICIENCY	88.0 %	89.0 %	88.0 %	STARTING CURRENT ...	153 A
MOTOR DATA	—	—	—	RATED CURRENT ...	24 A

IMPELLER DIAMETER  
**239 mm**

MOTOR # **21-18-4AA** STATOR **01D** REV **10**

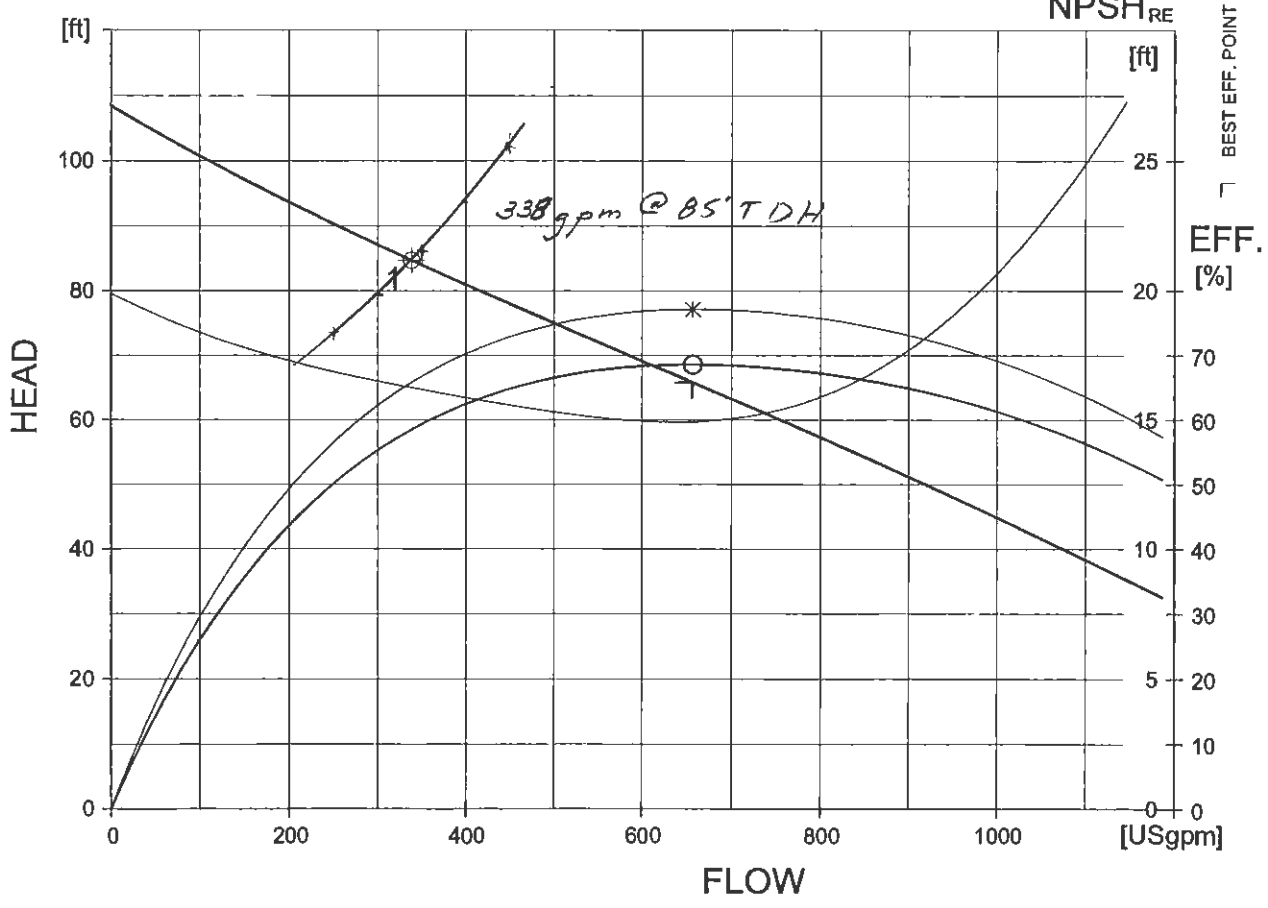
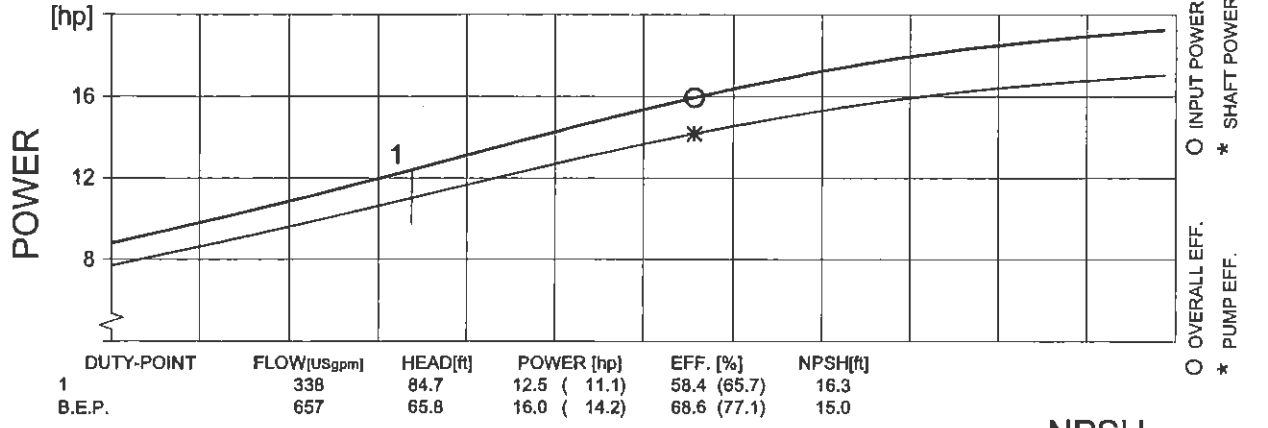
COMMENTS

INLET/OUTLET  
- /100 mm  
IMP. THROUGHLET  
---

RATED SPEED ..... **1760 rpm**  
TOT.MOM.OF INERTIA ... **0.086 kgm2**  
NO. OF BLADES **2**

FREQ. **60 Hz** PHASES **3** VOLTAGE **460 V** POLES **4**

GEARTYPE --- RATIO ---



FLYPS2.11 (20010918)

Performance with clear water and ambient temp 40 °C





## Rating

Frequency	<b>60 Hz</b>	Product	<b>3153 . 180</b>	Issue	<b>3</b>
Phases	<b>3</b>	Motor #	<b>21-18-4AA</b>	# of Starts/Hr	<b>15</b>
Poles	<b>4</b>	Rated power	<b>18.0 hp</b>	Issue date	<b>11/9/1999</b>
Approval		Installations	<b>PSTZ</b>	Valid from	
-	<b>N</b>	Type of duty	<b>S1</b>	Status	<b>APPR</b>

Rtd. amb. temp. **40 ° C / 104 ° F**

	<i>Alternative 1</i>	<i>Alternative 2</i>		
Voltage	<b>460 V</b>	<b>V</b>	Stator variant	<b>01</b>
Connection	<b>D</b>		Speed	<b>1760 r/min</b>
Rtd. Curr.	<b>24.0 A</b>	<b>A</b>	Power factor	<b>0.81</b>
Starting current	<b>153.0 A</b>	<b>A</b>	Module	<b>160</b>
NEMA code letter	<b>H</b>		Motor issue	<b>10</b>

### *Warm liquid data*

Note! Reduced rated power

Rtd. amb. temp.	<b>70 ° C / 158 ° F</b>	° C /	° F
Rtd. Curr. (1)	<b>22.0 A</b>	A	
Rtd. Curr. (2)	<b>0.0 A</b>	A	
Max input power	<b>13.4 kW</b>	kW	

Flygt



ITT Industries



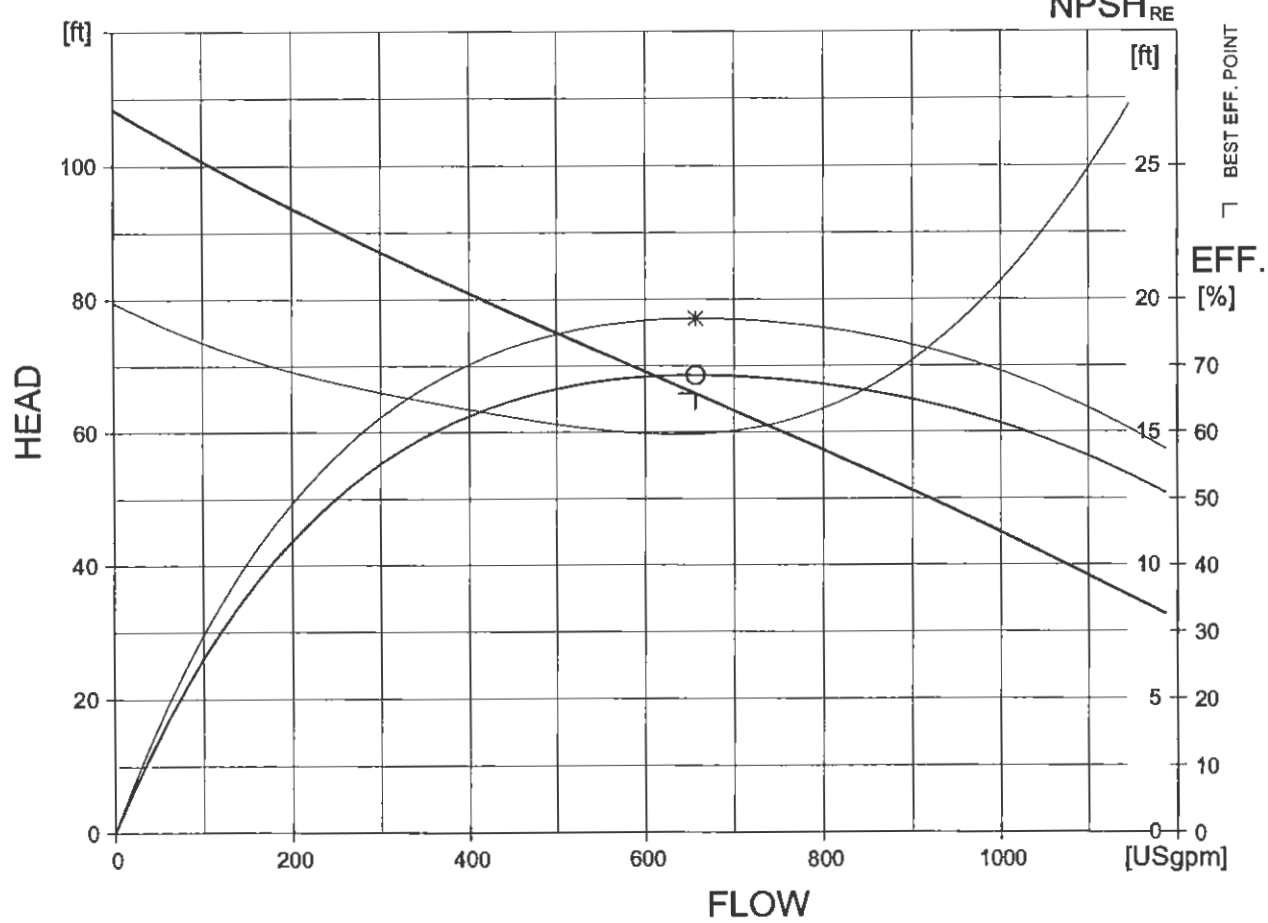
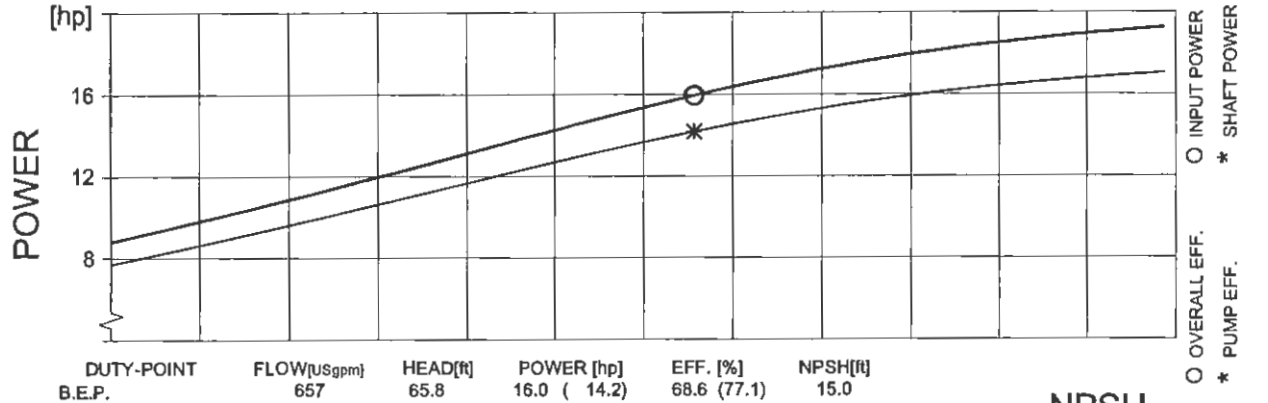
# PERFORMANCE CURVE

PRODUCT	TYPE
NS3153.180	HT
CURVE NO	ISSUE
63-455-00-6050	1

DATE	PROJECT
2003-03-19	

	1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER .....	18	hp
POWER FACTOR	0.81	0.74	0.62	STARTING CURRENT ...	153	A
EFFICIENCY	88.0 %	89.0 %	88.0 %	RATED CURRENT ...	24	A
MOTOR DATA	---	---	---	RATED SPEED .....	1760	rpm
COMMENTS	INLET/OUTLET			TOT.MOM.OF	0.086	kgm2
	- /100 mm			INERTIA ...		
	IMP. THROUGHLET			NO. OF		
				BLADES	2	

IMPELLER DIAMETER			
239 mm			
MOTOR #	STATOR	REV	
21-18-4AA	01D	10	
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4
GEARTYPE		RATIO	
---		---	



FLYPS2.11 (20010918)

Performance with clear water and ambient temp 40 °C



## CURVE



## Rating

Frequency	<b>60 Hz</b>	Product	<b>3153 . 180</b>	Issue	<b>3</b>
Phases	<b>3</b>	Motor #	<b>21-18-4AA</b>	# of Starts/Hr	<b>15</b>
Poles	<b>4</b>	Rated power	<b>18.0 hp</b>	Issue date	<b>11/9/1999</b>
Approval		Installations	<b>PSTZ</b>	Valid from	
-	<b>N</b>	Type of duty	<b>S1</b>	Status	<b>APPR</b>

Rtd. amb. temp. **40 ° C / 104 ° F**

	<i>Alternative 1</i>	<i>Alternative 2</i>		
Voltage	<b>460 V</b>	<b>V</b>	Stator variant	<b>01</b>
Connection	<b>D</b>		Speed	<b>1760 r/min</b>
Rtd. Curr.	<b>24.0 A</b>	<b>A</b>	Power factor	<b>0.81</b>
Starting current	<b>153.0 A</b>	<b>A</b>	Module	<b>160</b>
NEMA code letter	<b>H</b>		Motor issue	<b>10</b>

### *Warm liquid data*

Note! Reduced rated power

Rtd. amb. temp.	<b>70 ° C / 158 ° F</b>	° C /	° F
Rtd. Curr. (1)	<b>22.0 A</b>	A	
Rtd. Curr. (2)	<b>0.0 A</b>	A	
Max input power	<b>13.4 kW</b>	kW	

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ITT Industries



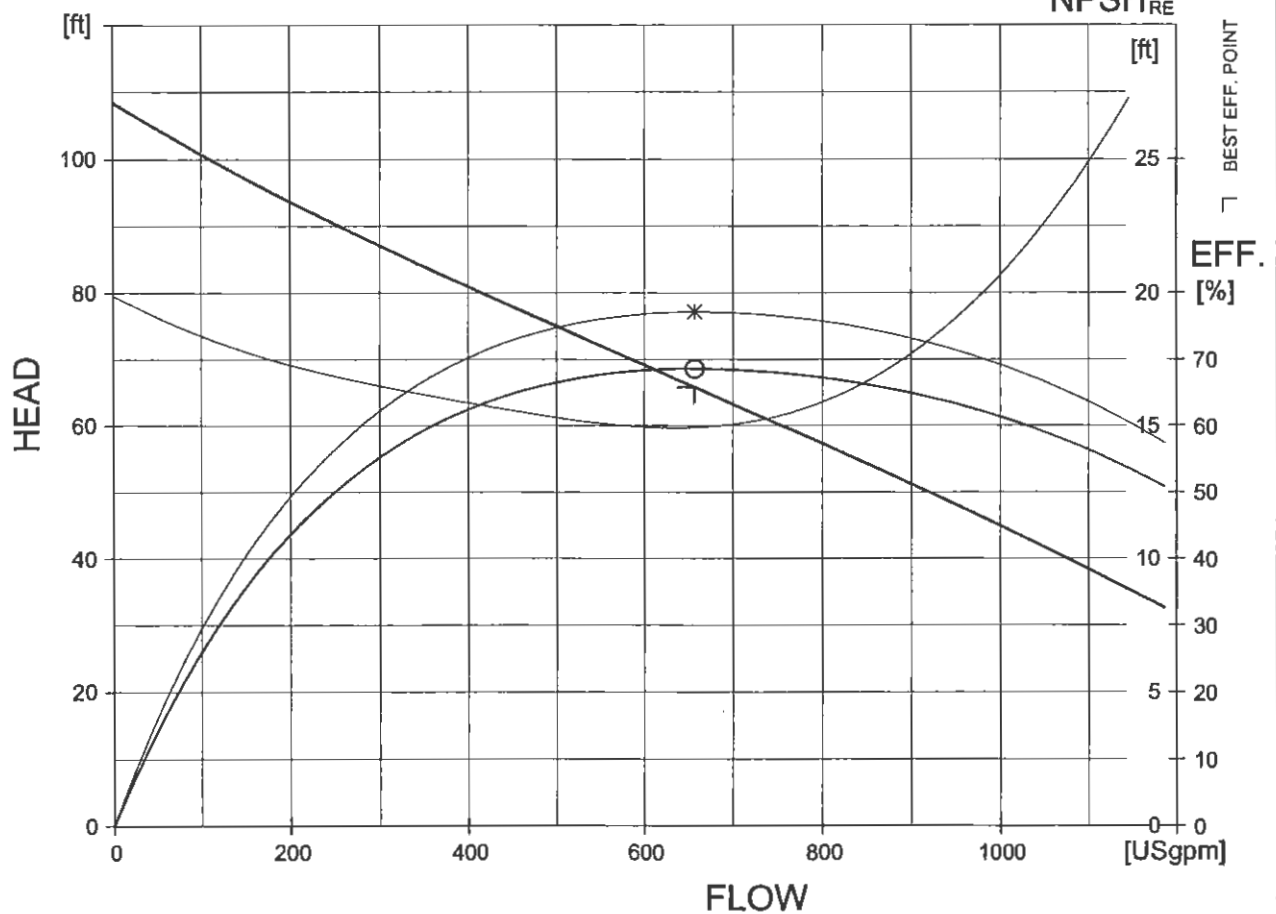
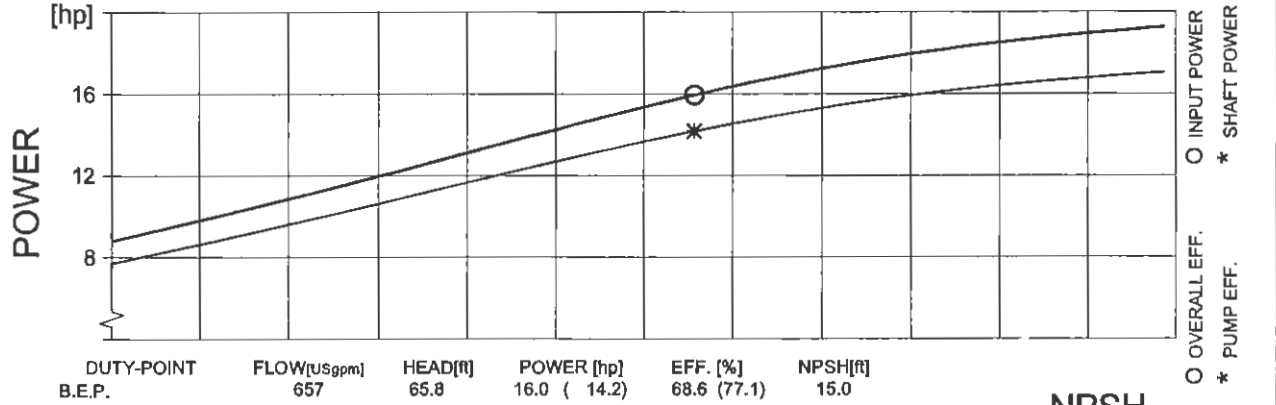
# PERFORMANCE CURVE

PRODUCT	TYPE
NS3153.180	HT
CURVE NO	ISSUE
63-455-00-6050	1

DATE	PROJECT
2003-03-19	

	1/1-LOAD	3/4-LOAD	1/2-LOAD	RATED POWER .....	18	hp
POWER FACTOR	0.81	0.74	0.62	STARTING CURRENT ...	153	A
EFFICIENCY	88.0 %	89.0 %	88.0 %	RATED CURRENT ...	24	A
MOTOR DATA	---	---	---	RATED SPEED .....	1760	rpm
COMMENTS	INLET/OUTLET			TOT.MOM.OF INERTIA ...	0.086	kgm2
	- /100 mm			NO. OF BLADES	2	
	IMP. THROUGHLET					

IMPELLER DIAMETER			
239 mm			
MOTOR #	STATOR	REV	
21-18-4AA	01D	10	
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	4
GEARTYPE		RATIO	
---		---	



FLYPS2.11 (20010918)

Performance with clear water and ambient temp 40 °C



## CURVE



***Series 165/300/386 Automatic Transfer Switches  
Warranty Coverage***

The Seller warrants its products to be free from defects in material or workmanship for a period of eighteen months from date of shipment.

All warranty claims of defective material or workmanship over said warranty period will be subject to inspection and verification by seller's authorized service personnel.

Products will be repaired, as necessary, free of all charges except transportation, and the correction of any defects by repair or replacement by the Seller constitute fulfillment of all obligations and liability of the Seller to the Buyer under this warranty. The limit of the Seller's liability with respect to any product(s) furnished hereunder, whether in contract, in tort, under any warranty, or otherwise, shall be the contract price herein of the specific product on which such liability is based.

When equipment is returned for repair due to causes not covered by Seller's warranty, the Buyer shall notify the Seller in writing and, after receipt of shipping instructions, the Buyer may return it to the ASCO Power Technologies, Receiving Department, 50 Hanover Road, Florham Park, NJ 07932, with shipping charges prepaid. Seller's Service Department will put such equipment in operating condition at the lowest possible cost. When necessary to make a return, give all possible information regarding the problem experienced and complete details of the installation with which the device was used.

The Seller is not responsible for damage of its product(s) through improper installation, maintenance, use, repairs or adjustments, or attempts to operate the product beyond its ratings, intentionally or otherwise, or for unauthorized repairs.

The Seller shall not be liable for and Buyer assumes responsibility for all personal injury and property damage resulting, from the handling, possession or use of the goods by the Buyer.

The Seller shall not be liable for specific consequential damages in any claim, action suit or proceeding arising under this transaction, nor shall there be any liability thereunder for claims of labor, loss of profit or good will, repairs or other expenses incidental to replacement.

No other representations, guarantees or warranties, express or implied, are made by the Seller and the foregoing warranty is in lieu of all other representations and warranties, express or implied, which are hereby expressly disclaimed and waived by the Buyer, including and warranty of merchantability or of fitness for particular purpose.

**ASCO Power Technologies  
Florham Park, New Jersey**

8 7 6 5 4 3 2 1  
**OUTLINE & MOUNTING FOR ASCO (D300, D388) SERIES TRANSFER SWITCHES, RATED 30, 70, 100, 150 & 200 AMPERES**

**GENERAL NOTES**

1. TYPE 3R/12 WALL MOUNTED ENCLOSURE.
2. STANDARD FINISH - LIGHT GREY, ANSI 61.
3. PLATED DOOR CLAMPS AND PADLOCK HASP ON LEFT SIDE.
4. SINGLE DOOR HINGED ON RIGHT.
5. TERMINALS - SCREW TYPE LUGS FOR EXTERNAL POWER CONNECTIONS.
6. THREE POLE SWITCH WITH SOLID NEUTRAL SHOWN FOR REFERENCE.
7. NEUTRAL CONFIGURATIONS:

D300-A FULL RATED SOLID (COPPER BUS) NEUTRAL CONFIGURATION FOR EACH SOURCE AND THE LOAD IS PROVIDED STANDARD. ~~OPTIONAL SWITCHED NEUTRAL POLE MAY BE PROVIDED AS SPECIFIED BY THE SWITCH NUMBER.~~

- ~~(A) SWITCHED NEUTRAL POLE~~
- ~~(B) OVERLAPPING NEUTRAL POLE~~

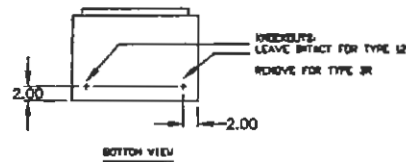
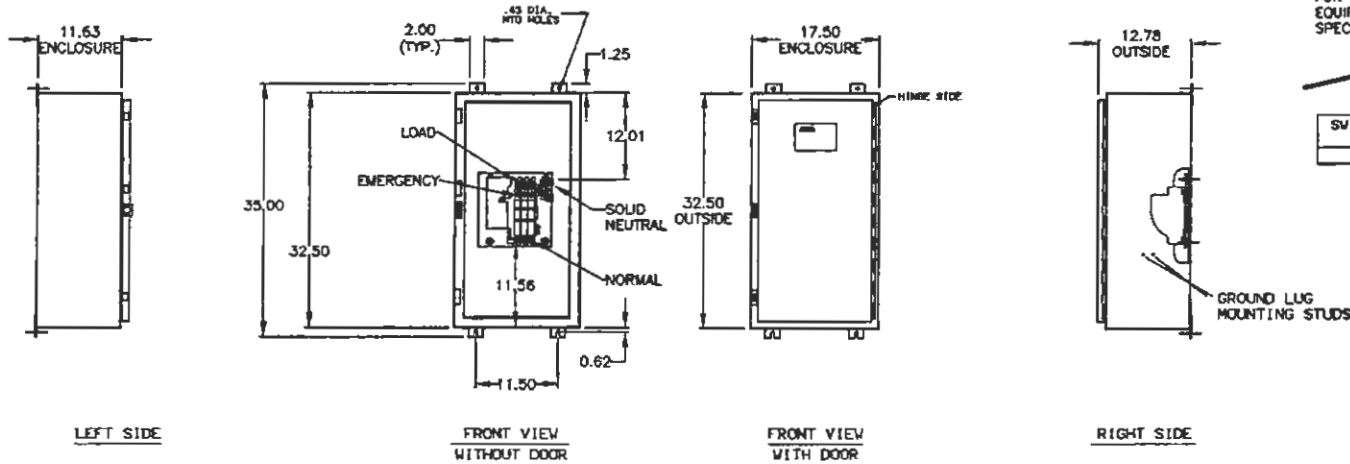
~~D388-AN OPTIONAL FULL RATED NEUTRAL CONFIGURATION FOR EACH SOURCE AND THE LOAD MAY BE PROVIDED. WHEN EQUIPPED IT IS IN ONE OF THE FOLLOWING FORMATS AS SPECIFIED BY THE CATALOG NUMBER NO. NEUTRAL TYPE:~~

- ~~(A) SOLID (COPPER BUS) NEUTRAL~~
- ~~(B) SWITCHED NEUTRAL POLE~~
- ~~(C) OVERLAPPING NEUTRAL POLE~~

SWITCH RATING (AMPS)	RANGE OF AL-CU WIRE SIZE
30-200	(1) #14 TO 4/0 AWG

APPROXIMATE SHIPPING WEIGHT, LBS (KG)

AMP SIZE	POLES	WEIGHT
30-200	2	84 (38)
	B2*	87 (40)
	C2*	87 (40)
	3	87 (40)
	B3*	90 (41)
	C3*	90 (41)



CATALOG NO. \_\_\_\_\_  
 CERTIFIED \_\_\_\_\_  
 TO ASCO, INC. \_\_\_\_\_  
 DATE \_\_\_\_\_ BY \_\_\_\_\_

PROJECT NO.	DATE	SCALE	REV.
<b>OUTLINE &amp; MOUNTING</b>			
D300-D388			
30-200 AMPS TYPE 3R/12			
ASCO	2000	1:1	AD00
DS1719688-002			

**60 AMP CIRCUIT BREAKER OUTPUT CONNECTIONS  
SIZE WILL BE:**

**#14 AWG TO #1 AWG (1 CONDUCTOR/PHASE)**

**104 AMP TRANSFER SWITCH CONNECTIONS SIZE  
FOR ALL EXTERNAL POWER WILL BE:**

**#14 AWG TO 2/0 AWG (1 CONDUCTOR/PHASE)**



**COMPLETE GENERATOR SET**  
**OVERALL DIMENSIONS:**

**LENGTH = 85.3”**

**WIDTH = 36.2”**

**HEIGHT = 84.3”**

**DIMENSIONS WITH ENCLOSURE**  
**DOORS OPEN:**

**LENGTH = 116.1”**

**WIDTH = 80.2”**

**COMPLETE GENERATOR SET**  
**APPROXIMATE WEIGHT:**

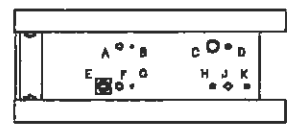
**3,300 LBS.**  
**(W/O FUEL)**

ENGINE	WEIGHT - kg [lbs]	CENTRE OF GRAVITY	
WITH OIL	WITH OIL & WATER	DM X	DM Y
1004Q/LL2014B	1388 [3016]	1380 [3076]	1000 [38.4]
1004Q/LL2014B	1483 [3277]	1481 [3280]	1071 [38.8]
1004Q/LL2014B	1443 [3181]	1471 [3243]	1071 [38.8]
1004Q/LL2014H	1483 [3277]	1481 [3280]	1071 [38.8]
1004Q/LL2014J	1633 [3590]	1581 [3441]	1029 [40.5]
1004TQ/LL2014D	1443 [3181]	1471 [3243]	1071 [38.8]
1004TQ/LL2014H	1483 [3277]	1481 [3280]	1071 [38.8]
1004TQ/LL2014J	1633 [3590]	1581 [3441]	1029 [40.5]
1004TQ/LL2014B	1388 [3016]	1380 [3076]	1000 [38.4]
1004Q2PA/LL2014B	1483 [3277]	1481 [3280]	1071 [38.8]
1004Q2PA/LL2014D	1443 [3181]	1471 [3243]	1071 [38.8]
1004Q2PA/LL2014H	1483 [3277]	1481 [3280]	1071 [38.8]
1004-40T/LL2014D	1443 [3181]	1471 [3243]	1071 [38.8]
1004-40T/LL2014H	1483 [3277]	1481 [3280]	1071 [38.8]
1004-40T/LL2014J	1633 [3590]	1581 [3441]	1029 [40.5]
1004-40T/LL2014B	1388 [3016]	1380 [3076]	1000 [38.4]

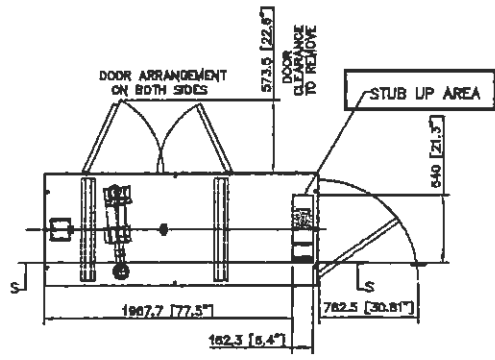
SOCKET	DESCRIPTION	DM X	DM Y	DM Z
A	FUEL TANK BREATHER - 1" BSP	830	814	808
B	FUEL RETURN - 3/8" BSP	940	814	808
C	EMERGENCY VENT - 3" BSP	1835	814	908
D	REMOTE FUEL SUPPLY - 1" BSP	1710	814	908
E	MANUAL FUEL FILL - 2" BSP	710	814	285
F	FUEL LEVEL GAUGE - 1" BSP	830	814	285
G	FUEL SUPPLY - 3/8" BSP	940	814	285
H	FUEL LEVEL SWITCH - 1" BSP	1835	814	285
J	REMOTE FUEL RETURN - 1" BSP	1710	814	285
K	LEAK DETECTION PROBE - 1" BSP	1880	814	285
L	PRIMARY TANK DRAIN - 2" BSP	1880	88	370
M	SECOND TANK DRAIN - 1" BSP	1842	78	285

ITEM	QTY	DESCRIPTION	DRAWING NO.
1	1	ENGINE	1003873
2	1	ALTERNATOR	1003873
3	1	RADIATOR ASSEMBLY	1003448
4	1	82 CANOPY ASSEMBLY	1002880
5	1	82 SERIES BASEFRAME ASSEMBLY	1002507
6	1	PANEL STAND ASSEMBLY	1003090
7	1	AIR FILTER ASSEMBLY	1003867
8	1	FAN/CHARGER ALT. GUARD ASSEMBLY	1003311
9	1	FUEL LINE ARRANGEMENT	1002830
10	1	COUPLING ARRANGEMENT	1002871
11	1	SENSORS & SENSORS UNIT	1003428
12	1	SEXAL ARRANGEMENT-UNIVERSAL LABELS	1003880
13	1	82 UPFIT	1002914
14	1	CONTROL PANEL	-
15	1	CIRCUIT BREAKER	-
16	1	LVI LUB OIL DRAINAGE	1002880
17	1	WYI RAD DRAINAGE	1003817

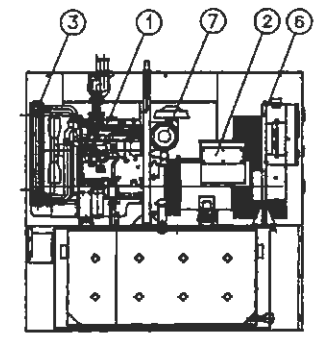
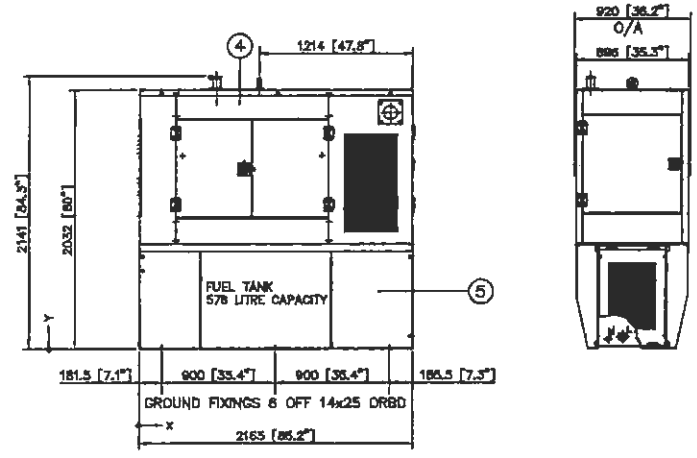
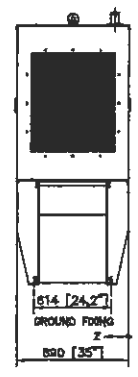
WEIGHTS AND C of G TO BE CONFIRMED



SOCKET ARRANGEMENT OF TANKBASE



FOR INFORMATION ONLY



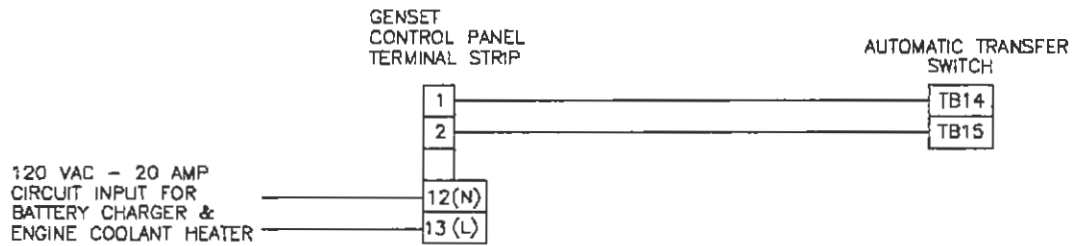
SECTION S-S


NOTE: ALL DIMENSIONS ARE IN MM & [INCHES]

U	ZONE A OIL DRAINAGE & FLOW STOPPED @ 2 H MAX TIME	2014P	DM	18/12/02
A	FINAL ISSUE		DM	23/12/02
ISSUE	DESCRIPTION	APPROVE	BY	DATE

THIS DRAWING IS UNCONTROLLED AND MAY BE CONSIDERED OBSOLETE FOR THE PURPOSES OF MAINTENANCE OF THE EQUIPMENT BY THE PURCHASER

23/12/02



REVISIONS			 <b>FABICK POWER SYSTEMS</b> 101 FABICK DRIVE, FENTON, MO. 63026 PHONE: (816)348-2500 FAX: (816)348-5851
NO.	DATE	BY	
1			PROJECT: STONE MEADOWS NORTH PS MUNICIPAL ELECTRIC CO ELECTRICAL INTERCONNECT PRINT
2			
3		JW	NONE
4			2-5-03
5			1 OF 1

FPS00302

# OLYMPIAN™

## STANDARD 12 MONTH WARRANTY

This warranty applies to all generator sets furnished by the Olympian generator set manufacturer (herein after referred to as "the Company") or Olympian dealers and sold and operated in the USA or Canada. All generator sets are warranted against defects in material and workmanship for a period of twelve months\* from the date of initial start-up (or eighteen months from sale or dispatch from the Company whichever occurs first). This warranty coverage is applicable to the first end user of the generator set only.

### The Company's Responsibilities

If a defect in material or workmanship arises during the warranty period the Company will:

- Replace or at the Company's discretion repair the defective parts.
- Provide for reasonable and customary labor costs incurred while affecting repairs to defects in accordance with the policies and repair times laid down by the Company.
- Provide limited travel labor and mileage if the generator set is inoperative due to a defect and, in the opinion of the Company, it cannot reasonably be transported to an appropriate service location.
- Provide for the cost of service supplies such as coolant, oil and filters when made unserviceable by the defect.

### The User's Responsibilities

The user is responsible for:

- Installing and operating the generator set in accordance with the manufacturer's instructions.
- Returning the Warranty Registration Form within ten days from the date of start-up or one month from the date of sale, whichever is earlier.

\* Generator set models D8L1-D25LH1 and D8L1S-D24LH1S have an additional running hour limitation as follows: Prime Power - 5000 hours at 1500/1800 rpm; Standby Power - 2000 hours at 1500/1800/3000 rpm and 1000 hours at 3600 rpm. Gas powered generator set models operating at 3000/3600 rpm also have a 1000 running hour limitation. Either the 12 month limitation or the running hour limitation is applicable, depending on which occurs first.

This warranty is expressly in lieu of all other warranties, express or implied, including, but not limited to, any warranty of merchantability or fitness for a particular purpose. All warranties which exceed the aforementioned obligations are hereby disclaimed by the Company and excluded from this warranty. The Company shall, under no circumstances, be held liable for any special direct, indirect, incidental or consequential damages. All claims under this warranty should be made by contacting your local Olympian Dealer or the Company who will outline the administration and scope.

- Ensuring initial start-up is performed by an Olympian Dealer or an authorized representative of the Company. In exceptional circumstances, said start-up will be waived but only if a Pre-Delivery Inspection has been completed by the Olympian Dealer. In such circumstances, warranty will be adjudged to have commenced one month and terminated thirteen months after the date of shipment by the Olympian Dealer.

- Accepting the Company's sole judgment as to whether the faulty part is defective in material or workmanship.

- Labor costs, except as stated under "The Company's Responsibilities," including costs incurred in removing and replacing the engine. However, consideration will be given in certain circumstances.

- Any costs in excess of the purchase price of the product.

- Other miscellaneous costs including but not limited to loss of use, travel, lodging, taxes, telephone calls, overtime, etc., except as stated under "The Company's Responsibilities."

- Completing payment for the purchase of equipment, parts or services relating to the equipment under warranty.

### Limitations

This warranty does not cover:

- Defects due to improper installation, maintenance or use.
- Modifications not authorized by the Company in writing.
- Parts not manufactured or supplied by the Company.
- Normal wear and tear.
- Tires, fuses and lamps.
- Subsequent failures after a defect has been, or ought reasonably to have been, discovered.
- Any operation in excess of the Company's rating or outside the stated site conditions.

# WARRANTY

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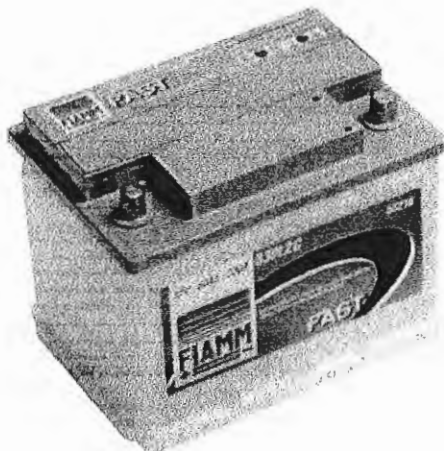
## STANDARD/OPTIONAL FEATURES

4001 AUTOSTART CONTROL PANEL	
STANDARD FEATURES	
<b>Instrumentation</b>	Voltmeter Ammeter Combined frequency and tachometer Hours run counter Coolant temperature gauge Lube oil pressure gauge Battery condition voltmeter
<b>Controls</b>	Run/off/auto switch Emergency stop button (red) Engine preheat pushbutton (if required) Lamp test pushbutton 7 pos voltmeter phase selector switch 4 pos ammeter phase selector switch 3 attempt start timer Cool down timer
<b>Shutdowns with Individual Warning Lamps</b>	Fail to start High coolant temperature Low lube oil pressure Overspeed
<b>Alarms with Individual Warning Lamps</b>	Low battery voltage
<b>Remote Signals/Contacts from Panel</b>	Interface to remote annunciator Terminals for remote emergency stop Common fault alarm signal Volt-free contact for generator set running
<b>Additional Fault Channels</b>	Channels available for optional shutdowns - 1 Channels available for optional alarms - 1 Additional fault channels available - 4 (individually programmable for shutdown or alarm) Note: This panel has seven fault indicating lamps available on the panel face for options. Note: UL base tanks utilize the additional alarm channel for a combined leak detection and low fuel level alarm. Note: PMK1 or PMA4 are not available if PMA3 has been ordered.
OPTIONAL FEATURES	
<b>Instrumentation</b>	PMA3 3 ammeters instead of 1 ammeter and selector switch PMK1 kilowatt meter (not available with PMA3) PMA4 static battery charger ammeter (not available with PMA3) PML1 lube oil temperature gauge PMBCUL3 panel mounted battery charger PMBCUL5 panel mounted battery charger
<b>Controls</b>	PSB5 panel emergency stop pushbutton with security key PSS1 speed adjust potentiometer (requires GOVE1 electronic governor) PSV1 voltage adjust potentiometer (±5%) PAA2 audible alarm supplied loose PAA1 panel mounted audible alarm PAC1 set of volt-free controls for common alarm PTC2 auto preheat control circuit (not for use with D150P4 or D200P4)
<b>Shutdowns with Individual Warning Lamps</b>	PPS2 underspeed PPV1 overvoltage/PPV3 undervoltage PPV2 combined over/undervoltage PPO1 overload shutdown via alarm switch on breaker PPO2 overload shutdown via overcurrent relay
<b>Remote Annunciators</b>	PAN4 8 channel remote annunciator panel (supplied loose) PAN5 16 channel remote annunciator panel (supplied loose) PAN6 Remote annunciator upgrade (Normal/Run control switch) PAN7 Lockdown stop button

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## LEAD ACID STARTING BATTERIES

The battery is cooled to - 18°C (0°F) and discharged at current indicated, the battery voltage must be 7.2 volts or above after 30 seconds.

Reserve Capacity is the time in minutes which the battery, at normal ambient temperature, can supply a current of 25 amps before the voltage falls to 10.5 volts.

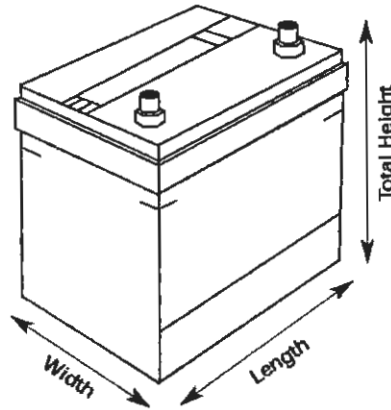
### GENERATING SET

### BATTERY SPECIFICATION GUIDE

Diesel Models	Gas Models	Volts	Battery Type	No. of Batteries	Cell Assembly	Type of Terminal
D8L1-D25LH1 D8L1S-D24LH1S D20P1-D75P3, D20P2-D75P2 D20P1S-D60P3S, D20P2S-D60P2S	G12U3-G25UH3, G10U3S-G25UH3S G20F3-G50F3 G20F3S-G45F3S	12	440L5	1		
D90P1-D150P1 D100P2-D125P2 D75P1S-D100P1S D75P2S-D100P2S	G50F3-G100F3 G55F3S, G75F3S	12	6ME10	1		
D150P4-D200P4	na	24	900CD	2		



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### BATTERY SPECIFICATIONS (PER BATTERY)

Battery Type	Dimensions			Weight (lbs)	Cold Cranking Amps/Din	Amp Hours	Cold Crankin Amps/SAE	Reserve Capacity
	Length (inch)	Width (inch)	Height (inch)					
440L5	13.9	6.9	7.5	52.9	440	92	780	170
6ME10	20.0	6.9	8.6	76.1	500	120	890	220
900CD	20.4	10.7	9.5	128	900	220	1620	390

#### CCA/DIN

This is the current drawn from the battery for 30 seconds at -18°C before the battery voltage drops below 9 volts.

#### Ahr

The test is carried out at 25°C and the battery is discharged at a current, which is set, so that the voltage falls to 10.5 volts after 20 hours. The Ampere-hours rating is the test current multiplied by the time.

#### CCA / SAE - Society of Automotive Engineers;

This is the High Current test carried out in line with the Society of Automotive Engineers specification in which the battery is cooled to -18°C (0°F) and discharged at the current indicated.

The requirement is for the battery voltage after 30 seconds to be 7.2 volts or above.

#### RC - Reserve Capacity;

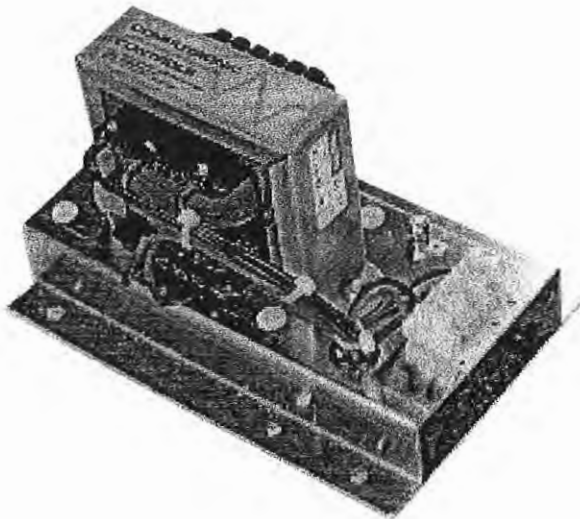
These capacity test shows the time in minutes, which the battery at 25°C can supply, a current of 25 amps before the voltage falls to 10.5 volts.

This is an indication of the period during which the battery can provide sufficient power to maintain the headlights and normal controls in the event of a failure of the alternator.

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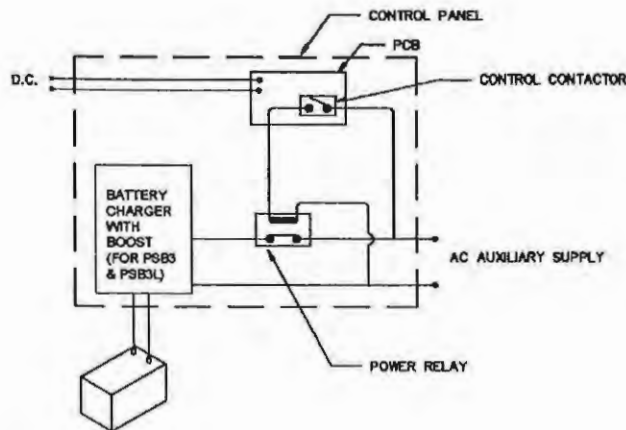
## STATIC BATTERY CHARGERS

OPTIONS: ~~PBC6L-110-120V, PBC6-208-240V~~

OPTIONS WITH BOOST: PSB3L 110-120V,  
PSB3-208-240V

These nominal 5 Amp battery charger options are of the constant voltage type, providing a trickle charge to the generator set battery(s) to help maintain an optimum charged condition for starting. An important feature of the chargers is the controlled rate of charging which prevents over-charging and thereby maximizes battery life. For options PSB3L and PSB3, when battery condition has been severely depleted an additional boost feature permits a manual over-ride to a fast charging level, with an automatic return to the normal trickle charge when an optimum battery charge level has been reached.

The battery chargers are powered by an AC auxiliary supply protected by a safeguard breaker inside the main control panel. When the generator set is not running the battery charger is automatically connected to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed and the engine has stopped.



### FEATURES

- Compact tamper proof design
- Pre-set voltage and current limits
- Service LED's to indicate mains, charging and charged status
- Housed within generator set control panel

Global Sourced

LEHX0483 01 (09-00)  
Supersedes USTECH/BATCHRG/0798

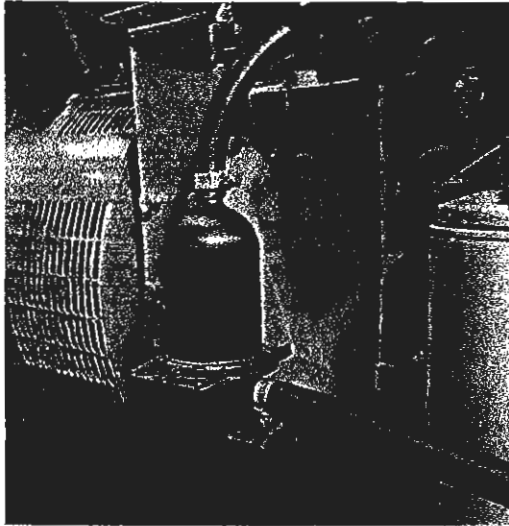
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Materials and specifications are subject to change without notice.  
The International System of Units (SI) is used in this publication.



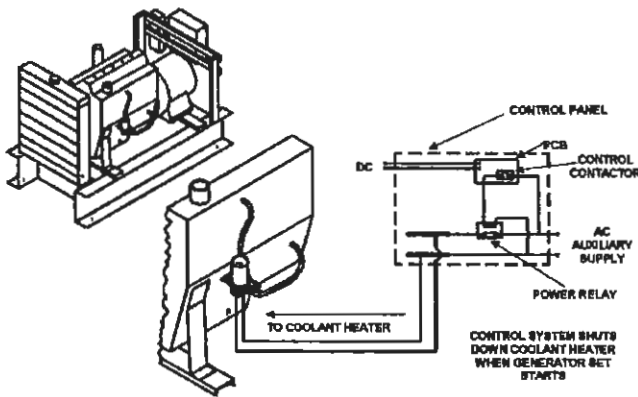
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## COOLANT HEATER WHL (110-120 V) OR WHH (208-240 V)

Appropriate when the generator set is to be sited in a low ambient environment the heater maintains the engine coolant at a temperature (typically 100°F (38°C)) which facilitates rapid starting and load acceptance. The heater assembly uses UL compliant components (to UL1030) and has CSA certification which is to both CSA & UL standards.

The heater itself is powered by a 110-120 volt or ~~208-240 volt~~ AC auxiliary supply protected by a safeguard breaker inside the main control panel. A thermostatic controller is included to regulate the output temperature to within safe limits. When the generator set is not running the heater is automatically connected to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed and the engine has stopped.



### FEATURES

- Molded from Polyphenylene Sulfide
- Rust free, corrosion resistant with exceptional tensile strength
- Vibration and shock tested to extreme limits to ensure durability
- Compatible with all coolant additives
- Incoloy element for longer service life



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### 110- 120 V [WHL]

3 Phase Generator Set Models Diesel	3 Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D8L1-D25LH1, D20L2	G12U3 - G25UH3	375	500
D20P1 - D75P3, D20P2 - D75P2	G20F3 - G25F3	750	1000
D90P1 - D150P1, D100P2 - D125P2	G30F3 - G100F3	1125	1500
D150P4 - D230P4	NA	1500	2000
Single Phase Generator Set Models Diesel	Single Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
D8L1S - D24LH1S, D20L2S	G10U3S - G25UH3S	375	500
D20P1S - D60P3S, D20P2S - D60P2S	G20F3S - G25F3S	750	1000
D75P1S - D100P1S, D75P2S - D100P2S	G30F3S - G75F3S	1125	1500

### 208- 240 V [WHH]

3 Phase Generator Set Models Diesel	3 Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
		208 Volts	240 Volts
D8L1-D25LH1, D20L2	NA	375	500
D20P1 - D75P3, D20P2 - D75P2	NA	750	1000
D90P1 - D150P1, D100P2 - D125P2	G30F3 - G100F3	1125	1500
D150P4 - D230P4	NA	1500	2000
Single Phase Generator Set Models Diesel	Single Phase Generator Set Models Gas	Nominal Coolant Heater Power Consumption (Watts)	
D8L1S - D24LH1S, D20L2S	NA	375	500
D20P1S - D60P3S, D20P2S - D60P2S	NA	750	1000
D75P1S - D100P1S, D75P2S - D100P2S	G30F3S - G75F3S	1125	1500

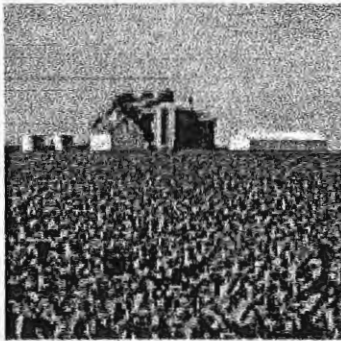
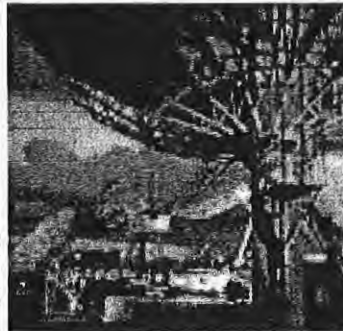
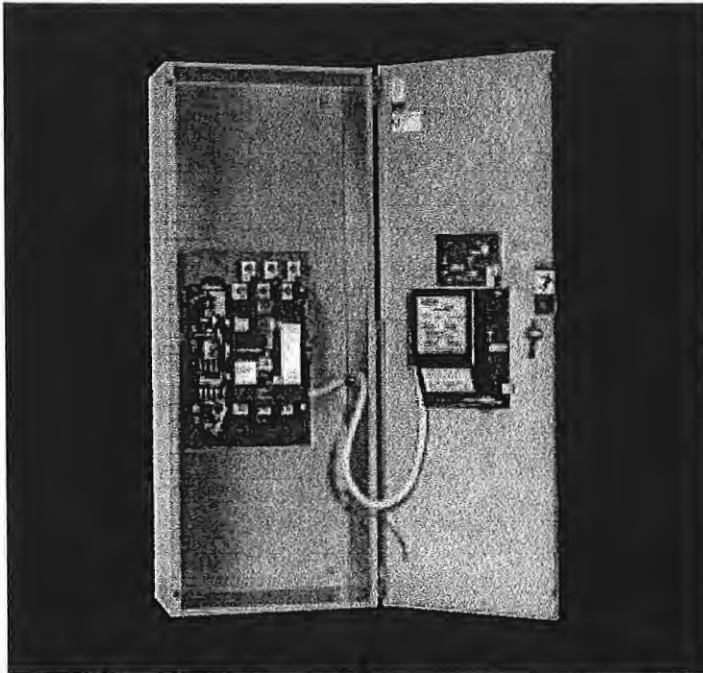
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# ASCO<sup>®</sup> Series 300

We Keep Your Power On<sup>®</sup>

## Power Transfer Switches



## Maximum Reliability & Excellent Value

With a Series 300 Transfer Switch, you get a product backed by ASCO Power Technologies, the industry leader responsible for virtually every major technological advance in the Transfer Switch industry.

The ASCO Series 300 was designed for one purpose—to automatically transfer critical loads in the event of a power outage. Each and every standard component was designed by ASCO engineers for this purpose.

The rugged construction and proven performance of the ASCO Series 300 assure the user of many years of complete reliability. The Series 300 is even designed to handle the extraordinary demands placed on the switch when starting or restarting stalled motors and switching high inrush loads.

ASCO's Series 300 modular, compact design makes it easy to install, inspect and maintain. All parts are accessible from the front so switch contacts can be easily inspected.

## Features

- The Series 300 is listed to UL 1008 standard for Transfer Switch Equipment and meets NFPA 110 for Emergency and Standby Power Systems and the National Electrical Code (NEC) Articles 700, 701 and 702. CSA listings are also available.
- 30 through 3000 amps in a compact design.
- Available to 600 VAC, single or three phase.
- True double-throw operation: The single solenoid design is inherently interlocked and prevents contacts from stopping between sources or from being in contact with both sources at the same time.

## UL Listed Withstand & Close-On Ratings

Switch Ratings amps	Available Symmetrical Amperes RMS at 600 VAC	
	When Used With Current Limiting Fuses	When Used With Specific Circuit Breakers
20	100,000	10,000
70, 100, 104, 450	200,000	22,000
200 (240 V Max.)	200,000	22,000
225, 260, 400	200,000	42,000
600, 800, 1000, 1200	200,000	65,000
1600, 2000	200,000	85,000
2600, 3000	200,000	100,000

**Note:** Current-limiting fuse should be Class J type through 400 amps; use class L type above 400-amp fuse rating.



Fig. 1: ASCO Power Transfer Switch rated 200 amperes shown in Type 3R enclosure

- There's no danger of the Series 300 ATS transferring loads to a dead source because the unique ASCO single-solenoid operator derives power to operate from the source to which the load is being transferred.
- Easy-to-read flush-mounted control and display panel provides LED indicators for switch position and source availability. It also includes test and time-delay bypass switches as standard features.
- Standard engine exerciser for weekly automatic testing of engine generator set with or without load.
- Adjustable time-delay feature prevents switch from being activated due to momentary utility power outages and generator dips.
- Supplied with solid neutral termination. Optional switched neutral pole available.
- Accessory kits available.
- Available for immediate delivery.
- Now available for service entrance applications. Contact ASCO for assistance.

The ASCO Microprocessor Controller is used with all sizes of Power Transfer Switches. It represents the most reliable microprocessor controller in the industry and includes, as standard, all of the voltage, frequency, control, timing and connectivity functions required for most emergency and standby power applications.



Fig. 7: ASCO Series 300 Microprocessor Controller

## Voltage & Frequency Sensing

- Adjustable three-phase, close-differential voltage sensing on normal source.
- Normal source pickup voltage is adjustable to 95% of nominal; drop-out is adjustable from 70% to 90% of nominal.
- Frequency sensing on emergency source. Pickup at 95% and dropout at 85% of nominal.

## Time Delays

- Adjustable time delay to override momentary normal source outages to delay all transfer switch and engine-starting signals.
- Transfer to emergency time delay—Adjustable from 0 to 5 minutes for controlled timing of load transfer to emergency.
- Retransfer to normal time delay—Adjustable to 30 minutes.
- Five-minute unloaded running time delay for emergency engine generator cool down.
- Four-second time delay to ignore momentary voltage and frequency transients during initial genset loading.

## Standard Selectable Features

- Inphase monitor to transfer motor loads, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Engine exerciser to automatically test backup generator each week—Includes control switch for testing with or without load.
- Selective load disconnect, double-throw contact to operate at an adjustable 0 to 20 second adjustable time delay prior to transfer and reset 0 to 20 seconds after transfer.
- 60 Hz or 50 Hz selectable switch.
- Three-phase/single-phase selectable switch.

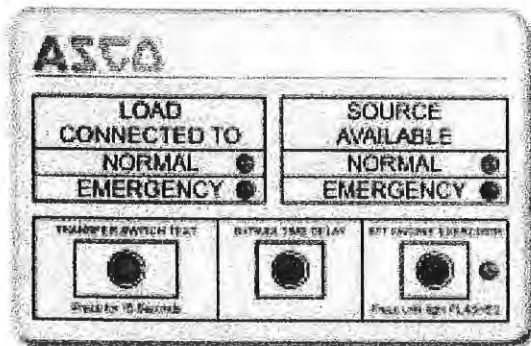


Fig. 8: Door-Mounted Control & Display Panel

## Control and Display Panel

- Easy-to-read flush-mounted control and display panel provides LED indicators for switch position and source availability. It also includes test and time-delay bypass switches.

## Remote Control Features

Terminal provisions for connecting:

- Remote test switch.
- Remote contact for test or for peak shaving applications. Circuit will be automatically bypassed if emergency source fails.
- Inhibit transfer to emergency.
- Remote time-delay bypass switch.

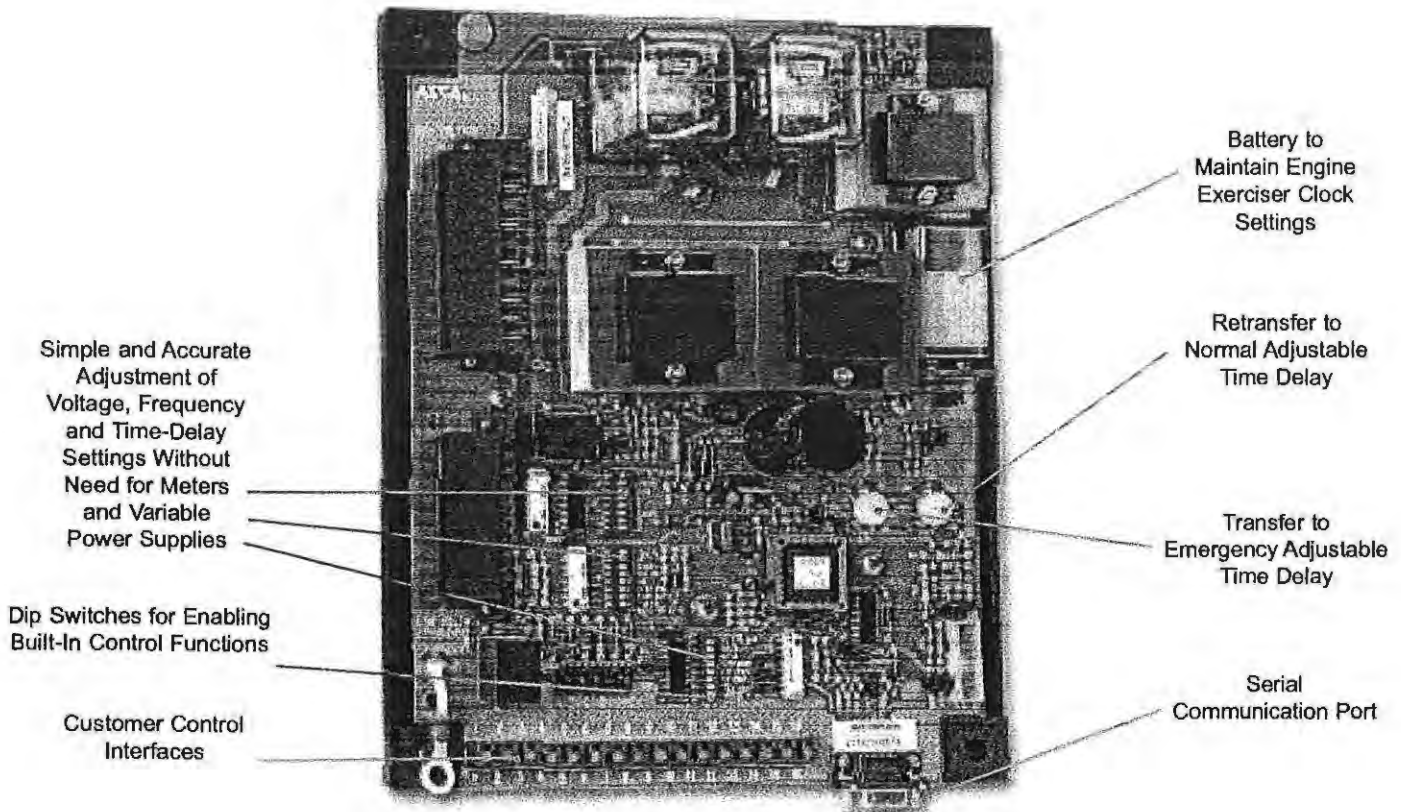


Fig. 9: Microprocessor Controller

## Performance Features

- 600 volt spacing per UL and CSA standards.
  - Interfacing relays are industrial grade, plug-in type with dust covers.
  - Meets or exceeds the requirements for Electromagnetic Compatibility (EMC).
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>◆ ANSI C37.90A/IEEE472 Voltage Surge Test</li> <li>◆ NEMA ICS-109.21 Impulse Withstand Test</li> <li>◆ Digital circuitry isolated from line voltages</li> <li>◆ IEC 801-2 Electrostatic discharge (ESD) immunity</li> <li>◆ ENV50140 and IEC 803-1: Radiated electromagnetic field immunity</li> </ul> | <ul style="list-style-type: none"> <li>◆ IEC 801-4 Electrical fast transient (EFT) immunity</li> <li>◆ ENV50142 Surge transient immunity</li> <li>◆ ENV50141: Conducted radio-frequency field immunity</li> <li>◆ EN55011: Group 1, Class A conducted and radiated emissions</li> <li>◆ Optically isolated RS-485 Serial Port</li> </ul> |
|---|--|

## Accessory 11CD

Deluxe programmable engine exerciser provides ability to uniquely program each day of the week, or blocks of days from one minute to 24 hours with digital readout convenience. Includes "with or without" load control switch for exercise period. Load indicator in display to show if exerciser is ON or OFF. Timer also includes a permanent battery to maintain settings when normal and emergency power is lost.

## Accessory 14AA/14BA

Auxiliary contacts to indicate position of main contacts. Two (2) for normal and two (2) for emergency position (one set is standard).

## Accessory 44A

Strip Heater with thermostat for extremely cold areas to prevent condensation and freezing of this condensation. External 120 volt power source required.

## Accessory 44G

Strip Heater with thermostat, wired to load terminals: 208-240, 360-380, 460-480, 550-600 volts. Contains wiring harnesses for all transfer switch sizes.

## Accessory 72A

Communications Interface Module (RS-485) to allow local or remote communications with ASCO PowerQuest® VPI or SiteWeb™ communication products.

## ASCO Pulsar® 450 High-Performance Surge Suppressor

The ASCO Pulsar® 450 provides unparalleled protection from power surges and transients. It is a high-performance surge suppressor which limits large surges and transients through a unique array of computer-matched metal oxide varistors (MOVs). Unique four-cavity sand packed UL94-5 volt rated housing, UL1449, UL1283, and CSA listed. Available as a separate product only for mounting by customer. Contact ASCO for ordering information.

### Field Conversion Kits for Series 300 Transfer Switches

Kit No.	Description
K601111	Deluxe Engine Exerciser Kit (Acc. 11CD)
K613127-001	Strip Heater Kit (125 watt) 120 volt (Acc. 44A)
K613127-002	Strip Heater Kit (125 watt) 208-480 volt (Acc. 44G)
K609027	Cable Pull Box (1600-2000 amp)

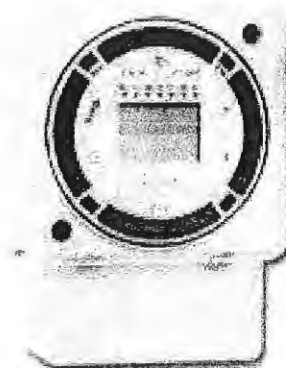


Fig. 10: Deluxe Engine Exerciser (Accessory 11CD)

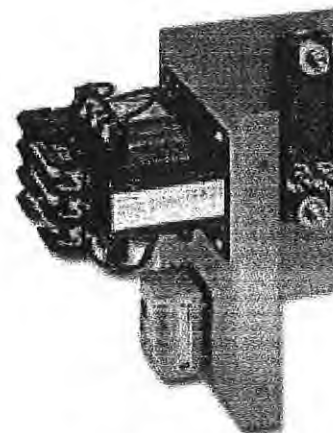


Fig. 11: Strip Heater Kit (Accessory 44G)

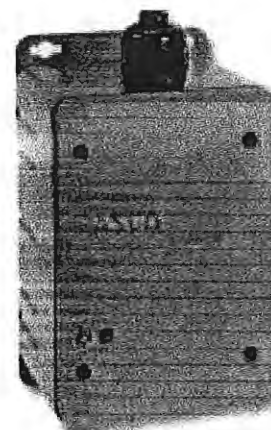


Fig. 12: Pulsar 450 Surge Suppressor

# Dimensions & Shipping Weights for ASCO Series 300 & 386 Transfer Switches

UL Type 1 Enclosure (See notes below for information on Type 3R, 4 & 12 Enclosures)  
**-SEE FOLLOWING DRAWING ALSO-**

Switch Rating amps	Phase Poles	Neutral Code	Dimensions, In. (mm) <sup>3</sup>			Approx. Shipping Weight Lb. (kg) <sup>4</sup>
			Width	Height	Depth	
30, 70, 100, 104	2	A	17 1/2 (445)	31 (787)	11 5/8 (295)	67 (31)
	2	B	17 1/2 (445)	31 (787)	11 5/8 (295)	70 (32)
	3	A	17 1/2 (445)	31 (787)	11 5/8 (295)	70 (32)
	3	B	17 1/2 (445)	31 (787)	11 5/8 (295)	73 (33)
150, 200	2	A	17 1/2 (445)	31 (787)	11 5/8 (295)	69 (32)
	2	B	17 1/2 (445)	31 (787)	11 5/8 (295)	72 (33)
	3	A	17 1/2 (445)	31 (787)	11 5/8 (295)	72 (33)
	3	B	17 1/2 (445)	31 (787)	11 5/8 (295)	75 (34)
225, 260, 400	2	A	18 (457)	48 (1219)	13 (330)	117 (53)
	2	C	18 (457)	48 (1219)	13 (330)	125 (57)
	3	A	18 (457)	48 (1219)	13 (330)	125 (57)
	3	C	18 (457)	48 (1219)	13 (330)	133 (61)
600, 800, 1000	2	A	34 (864)	72 (1829)	20 (508)	400 (182)
	2	B	34 (864)	72 (1829)	20 (508)	420 (192)
	3	A	34 (864)	72 (1829)	20 (508)	420 (192)
	3	B	34 (864)	72 (1829)	20 (508)	446 (203)
1200	2	A	38 (965)	87 (2210)	24 (610)	685 (312)
	2	B	38 (965)	87 (2210)	24 (610)	705 (321)
	3	A	38 (965)	87 (2210)	24 (610)	705 (321)
	3	B	38 (965)	87 (2210)	24 (610)	734 (333)
1600, 2000 <sup>1</sup>	3	A	38 (965)	87 (2210)	24 (610)	955 (433)
	3	B	38 (965)	87 (2210)	24 (610)	1005 (455)
2600, 3000 <sup>2</sup>	3	A	38 (965)	91 (2311)	60 (1524)	1395 (633)
	3	B	38 (965)	91 (2311)	60 (1524)	1460 (663)

## Series 300 & 386 External Power Connections Sizes UL-Listed Solderless Screw-Type Terminals

Switch Rating (amps)	Ranges of AL-CU Wire Sizes (Unless Specified Copper Only)
30, 70, 100, 104	One #14 to 2/0 AWG
150	One #8 to 3/0 AWG
200	One #8 to 3/0 AWG CU Only
225, 260, 400	Two 1/0 AWG to 250 MCM or One #4 AWG to 600 MCM
600	Two 1/0 AWG to 600 MCM
800, 1000, 1200	Four 1/0 to 600 MCM
1600, 2000	Six 1/0 to 600 MCM
2600	Twelve 3/0 to 600 MCM
3000	Twelve 3/0 to 600 MCM

**Note:** All Series 300 switches are furnished with a solid neutral plate (unless switched neutral configuration is specified) and terminal lugs. Specify "A" in catalog number to order a neutral plate on the series 386 switches.

### Notes:

- Unit is designed for top cable entry of emergency & load and bottom entry of normal. A cable pull box is also available for all top or bottom cable access when required (optional accessory kit #K609027). Not required for type 3R, 4 & 12 enclosures where available.
- Enclosures for 2600, 3000 amps are free-standing with removable top, sides & back.
- For type 3R, 4 & 12 dimensions, add the following values to the type 1 dimensions:
  - 30, 70, 100, 104, 150, 200A-add 1.5 in (38 mm) to the height.
  - 400, 600, 800, 1000A-add 1.5 in (38 mm) to the depth.
  - 1200A-type 4 & 12 not available-use 1600 amp switch
  - 1600A-add 3 in (76 mm) to the height and 10 in to (253 mm) to the width.
  - 2000, 2600, 3000A-type 4 & 12 not available. (Consult ASCO) Type 3R add 4.68 in (118 mm) to the height add 2.0 in (51 mm) to the width and add 13 in (329 mm) to the depth.
- For type 3R, 4 & 12 weights, add the following values to the type 1 weights:
  - 30, 70, 100, 104, 150, 200A-add 15 lbs. (6.8 kg).
  - 400, 600, 800, 1000A-add 40 lbs. (18.1 kg).
  - 1600A-add 60 lbs. (27 kg).
  - 2000A-3000A Type 4 & 12 not available. (Consult ASCO)
- When temperatures below 32°F can be experienced, special precautions should be taken, such as the inclusion of space heaters, to prevent condensation and freezing of this condensation. This is particularly important when environmental enclosures (Type 3R, 4 & 12) are ordered for installation outdoors.



# Ordering Information for ASCO Series 300 & 386 Transfer Switches

**CAT. NUMBER = 3003104N1XF,11CD,480VAC,60Hz**

To order an ASCO Series 300 Power Transfer Switch, complete the following catalog number:

300 + B + 3 + 600 + N + 1 + X + C + 11CD + 480 V 60 Hz											
Product	Neutral Code	Poles	Amperes	Voltage Code		Controller	Options	Enclosure		Optional Accessories	Specific Volt & Freq
				A <sup>4</sup>	B <sup>4</sup>			Blank	Open Type		
300	Blank Solid Neutral  B' Switched Neutral	2 poles, 1Ø  3 poles, 3Ø	Continuous rating  30, 70, 104, 150, 200 <sup>2</sup> , 225, 260, 400, 600, 800, 1000, 1200, 1600, 2000 2600, 3000	A <sup>4</sup>	115	1	Insert "X" If optional accessories are required	C	Type 1 (Standard)	11CD Deluxe Engine Exerciser	This information is necessary to allow correct control settings prior to shipment
				B <sup>4</sup>	120				E		
				C	208			G	Type 4 Enclosure <sup>3</sup>	44A, 44G Strip Heater w/Thermostat	
				D	220			L	Type 12 Enclosure <sup>3</sup>	72A Comm Interface Module	
				E	230						
				F	240						
				H	380						
				J	400						
				K	415						
				L	440						
				M	460						
				N	480						
				Q	575						
				R	600						

To order an ASCO Series 386 Transfer Switch, complete the following catalog number:

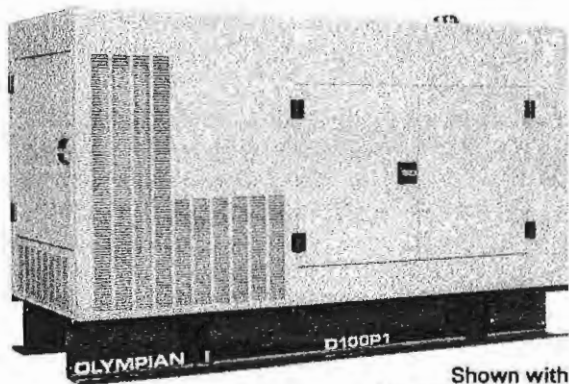
386 + B + 3 + 600 + N + 1 + X + C + 9C/9D + 480 V 60 Hz											
Product	Neutral Code	Phase Poles	Amperes	Voltage Code		Controller	Options	Enclosure		Optional Accessories	Specific Volt & Freq
				A <sup>4</sup>	B <sup>4</sup>			Blank	Open Type		
386	A Solid Neutral  B' Switched Neutral	2 poles, 1Ø  3 poles, 3Ø	Continuous rating  30, 70, 100, 150, 260, 400, 600, 800, 1000, 1200, 1600, 2000, 3000	A <sup>4</sup>	115	1	Insert "X" If optional accessories are required	C	Type 1 (Standard)	6Q Key-Operated Control	This information is necessary to allow correct control settings prior to shipment
				B <sup>4</sup>	120				F		
				C	208			G	Type 4 Enclosure <sup>3</sup>	14AA/14BA Auxiliary Contacts	
				D	220			L	Type 12 Enclosure <sup>3</sup>		72A Comm Interface Module All Accessories
				E	230						
				F	240						
				H	380						
				J	400						
				K	415						
				L	440						
				M	460						
				N	480						
				Q	575						
				R	600						

- Note:**
1. Specify neutral code "C" for 225, 260, and 400 amperes only.
  2. 200 amps limited to 240 volts.
  3. Available 30-1600 ampacity. Use Type 3R for 2000-3000 amp applications.
  4. 115-120 volt available 30-400 amps only. For other voltages contact ASCO. Consult ASCO for special ordering when a CSA label is required.

## Extended Warranties for Series 300 Transfer Switches

Catalog No.	Description
2EXW300	Two-Year Extended Warranty (Parts & Labor)
3EXW300	Three-Year Extended Warranty (Parts & Labor)
4EXW300	Four-Year Extended Warranty (Parts & Labor)
5EXW300	Five-Year Extended Warranty (Parts & Labor)

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Shown with  
Optional Equipment

## CAWB – WEATHERPROOF ENCLOSURES

These weatherproof, factory installed, enclosures incorporate internally mounted critical level silencers, matched for safety and aesthetic value on fabricated steel skidbases on diesel models. Optional UL listed tanks are available. These enclosures are of extremely rugged construction to withstand outdoor exposure to the elements of weather and rough handling common on many construction sites. They are designed on modular principles with many interchangeable components permitting on-site repair.

Note: Options FSS1, FSS2, FSS5 and FSS6 (fuel level alarm) are not available on non-UL "B Series" base tanks.

### FEATURES

#### ROBUST/HIGHLY CORROSION RESISTANT CONSTRUCTION

- Black zinc die cast hinges tested and proven to withstand extreme conditions of corrosion
- Zinc plated or stainless steel fasteners
- Body made from sheet steel components pre-treated with zinc phosphate prior to polyester powder coating at 392°F (200°C)

#### EXCELLENT ACCESS

- Large cable entry area for installation ease
- Doors located convenient to controls and service areas
- Double doors on both sides
- Vertically hinged doors allow 180° opening rotation
- "Lift-off" doors, removable with 45° opening in confined locations
- Lube oil and coolant drains piped to exterior of enclosure and terminated with drain valves
- Hinged radiator fill cover

#### SECURITY AND SAFETY

- Lockable access doors with standard key utilization
- Cooling fan and battery charging alternator fully guarded
- Fuel fill can only be reached via lockable access doors (only provided when optional fuel tank is ordered)
- Exhaust silencing system totally enclosed for operator safety
- Roof outlet exhaust with sealed roof aperture and rain cap
- Stub-up cover sheets for "rodent proofing"

#### TRANSPORTABILITY

- Lifting points on baseframe
- Optional tested and certified single point lifting facility

### OPTIONS

- PVW2 Panel Viewing Window for CAWB
- CSB2 External Emergency stop push button (red) mounted flush on exterior enclosure wall
- BLP2 Single Lift for CAWB (not available for gas models)
- FTP Integral metal fuel tank



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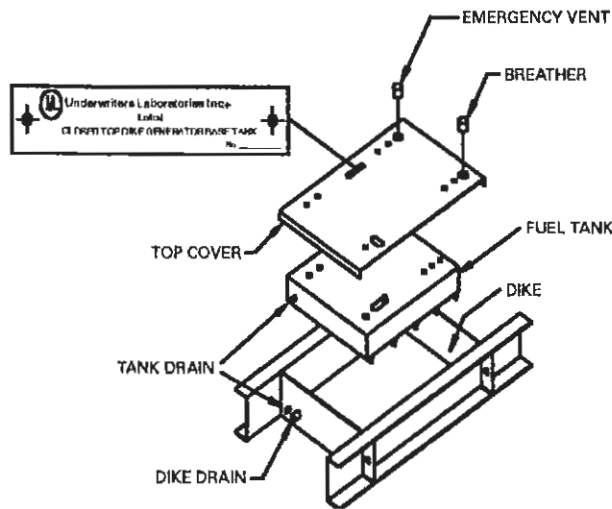
## UL LISTED FUEL TANKS

FCUL1 — 12 HR

FCUL2 - 24 HR

### CLOSED TOP DIKED SKID BASE FUEL TANK

The generator set skid base contains an integral, UL listed, double walled, steel fuel storage tank with diked rupture basin for the containment of fuel resulting from a tank leak or rupture. The rupture basin is integrally vented and has a closed top to prevent the ingress of precipitation, debris or other elements. The tank is leak tested to 3 psi and pressure tested to 15 psi. The base tank is UL142 listed for Steel Above Ground Tanks for Flammable and Combustible Liquids under the "Special Purpose Tanks" category. They are intended for installation in accordance with the Flammable and Combustible Liquids Code, NFPA 30 of the National Fire Protection Association.



### FEATURES

#### CONSTRUCTION

- Manufactured entirely from 4 mm (8 gauge) steel
- Continuously welded seams
- Formed steel channel type side beams
- Unitized load bearing structure
- Integral lifting points
- Corrosion resistant precoat
- Listed to UL142
- Closed top diked base tank

#### AESTHETICS

- Continuous high gloss finish
- Polyester powder composite
- Extremely durable and corrosion resistant

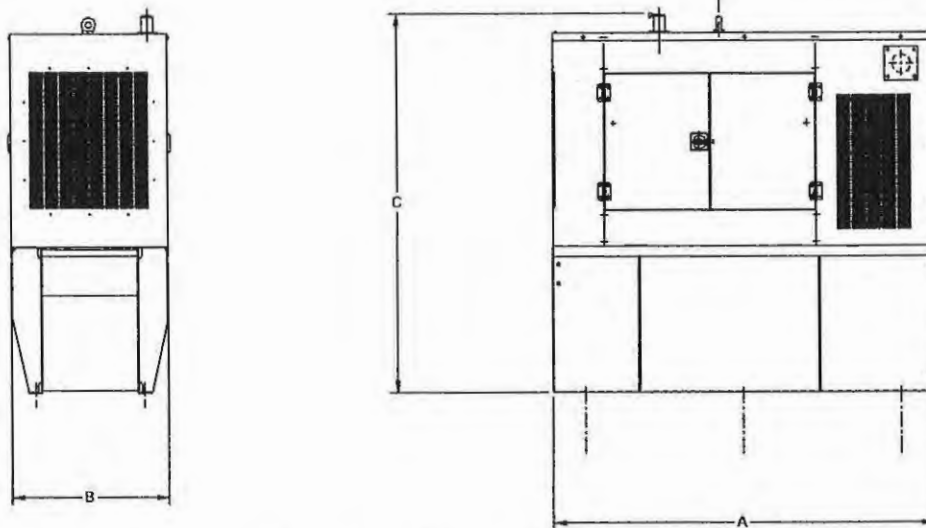
#### DESIGN FEATURES

- Unique integral base and tank design
- Developed specifically for open or enclosed generator sets
- Containment capacity for fuel
- Internal baffles arranged to prevent recirculation of heated return fuel
- Brass composite 2" filler cap
- Mechanical fuel gauge
- Fuel capacities to provide typically 12 and 24 hour standby operation
- Primary vent with breather

- Vent located accessible for adapting to remote venting
- Venting areas to UL142 specifications
- Leak detection switch
- Emergency vent for main tank
- Weatherproof diked containment basin
- External NPT drain fittings for fuel tank and containment basin
- Removable base-end cover plate encloses stub-up area when used with enclosures



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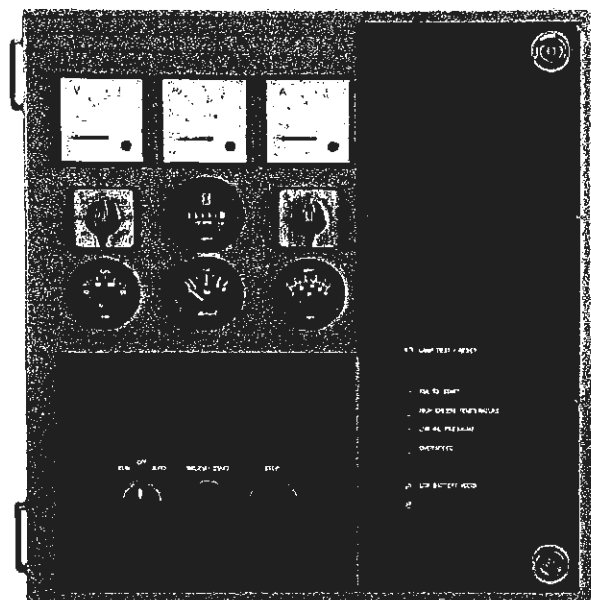


## WEATHERPROOF ENCLOSED GENERATOR SETS WITH CAWB ENCLOSURE DIMENSIONS AND WEIGHTS WITH UL LISTED FUEL TANK

Generator Set Model	Working Tank Capacity, US gallons (liters)		Generator Dimensions, in (mm)				Weight lb (kg)	
			Length A	Width B	Height, 12 hr	Height, 24 hr	12 hr	24 hr
	C	C						
D20P1, D25P1,	NA	64.7 (245)	72.6 (1854)	35.7 (906)	NA	69.7 (1770)	NA	2197 (997)
D20P2, D25P2, D30P4	NA	64.7 (245)	72.6 (1854)	35.7 (906)	NA	69.7 (1770)	NA	2458 (1115)
D30P3	77.1 (292)	152.2 (576)	85.3 (2167)	36.3 (923)	75.8 (1926)	84.3 (2141)	2542 (1153)	3078 (1396)
<b>D40P3, D40P2</b>	<del>77.1 (292)</del>	152.2 (576)	85.3 (2167)	36.3 (923)	<del>75.8 (1926)</del>	84.3 (2141)	<del>2663 (1208)</del>	3199 (1451)
D50P3, D60P3, D50P2, D60P2	77.1 (292)	152.2 (576)	85.3 (2167)	36.3 (923)	75.8 (1926)	84.3 (2141)	2817 (1278)	3353 (1521)
D75P3, D75P2	77.1 (292)	152.2 (576)	85.3 (2167)	36.3 (923)	75.8 (1926)	84.3 (2141)	2906 (1318)	3441 (1561)
D90P1- D100P1, D100P2	102 (386)	199.5 (755)	94.6 (2404)	37.3 (948)	74.4 (1908)	86.0 (2183)	4114 (1866)	4076 (1849)
D125P1, D125P2	151.7 (574)	307.8 (1165)	115.5 (2934)	44.4 (1128)	86.3 (2191)	93.7 (2380)	4398 (1995)	4852 (2201)
D150P1	151.7 (574)	307.8 (1165)	115.5 (2934)	44.4 (1128)	86.3 (2191)	93.7 (2380)	4520 (2050)	4974 (2256)
D150P4	238.8 (904)	391.2 (1481)	129.7 (3294)	52.7 (1338)	84.8 (2155)	94.8 (2408)	5549 (2517)	6038 (2739)
D200P4	238.8 (904)	391.2 (1481)	129.7 (3294)	52.7 (1338)	84.8 (2155)	94.8 (2408)	5789 (2626)	6276 (2847)
D20P1S, D25P1S,	NA	245 (64.7)	72.6 (1854)	35.7 (906)	NA	69.7 (1770)	NA	2198 (997)
D20P2S, D25P2S	NA	245 (64.7)	72.6 (1854)	35.7 (906)	NA	69.7 (1770)	NA	2459 (1115)
D30P3S, D40P3S, D30P2S, D40P2S	77.1 (292)	152.2 (576)	85.3 (2167)	36.3 (923)	75.8 (1926)	84.3 (2141)	2817 (1278)	3353 (1521)
D50P3S, D60P3S, D50P2S, D60P2S	77.1 (292)	152.2 (576)	85.3 (2167)	36.3 (923)	75.8 (1926)	84.3 (2141)	3016 (1368)	3552 (1611)
D75P1S, D75P2S	102 (386)	199.5 (755)	94.6 (2404)	37.3 (948)	74.4 (1908)	86.0 (2183)	3598 (1632)	3973 (1802)
D90P1S- D100P1S, D90P2S- D100P2S	151.7 (574)	307.8 (1165)	115.5 (2934)	44.4 (1128)	86.3 (2191)	93.7 (2380)	4520 (2050)	4855 (2202)

Weight with lube oil and coolant

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Panel pictured may include optional accessories

## 4001 AUTOSTART CONTROL PANEL

The 4001 control panel is designed for automatic starting and stopping of the generator set with 2 wire remote contacts as well as manual starting and stopping. The panel provides engine and generator instrumentation for volts, amps, combined frequency meter and tachometer, coolant temperature, lube oil pressure and battery condition voltmeter. The control system provides shutdown protection with individual indicating lamps on the panel for high coolant temperature, low oil pressure, fail to start and overspeed along with a low battery voltage alarm indicating lamp. An engine cool-down timer is included for normal shutdowns. Optional instrumentation, alarms and shutdowns are available.

The 4001 control panel has one additional shutdown protection control channel and one additional alarm circuit channel with indicating lamps for alarm and shutdown options.

Terminals are included for interface with remote annunciators of generator set shutdowns and alarms.

### FEATURES

#### CONSTRUCTION AND FINISH

- Components installed in a heavy duty sheet steel enclosure
- Phosphate chemical pre-coating of steel provides corrosion resistant surface
- Polyester composite powder top-coat forms high gloss and extremely durable finish
- Lockable hinged panel door provides for easy component access

#### MOUNTING

- Mounted to generator set baseframe on robust steel stand
- Vibration isolated from generator set
- Located at rear of generator set with excellent panel visibility
- Installed as an integral part of the enclosure on enclosed generator sets

#### INSTRUMENTATION

- AC instruments are 90° deflection, 72 mm square, flush mounting
- AC instruments in accordance with IEC60051 and 60529, DIN43700 and 43718, BSEN60051 and 61010, UL94
- Engine gauges are heavy duty, 52 mm diameter, electrically operated

#### CONTROLS

- Protected by fused DC supply from starting battery
- Printed circuit board assemblies with field proven circuit elements
- Thoroughly tested during manufacture and final test of generator set
- Multi-pin plug and socket connections for ease in servicing
- Switches and pushbuttons are heavy duty industrial type
- Internal AC and DC panel wiring harnesses pre-formed for uniform routing and enhanced interconnect reliability



**HOMEFIELD PHASE III  
LIFT STATION**

**SPECIFICATIONS AND SHOP DRAWINGS  
FOR BACK-UP GENERATOR**

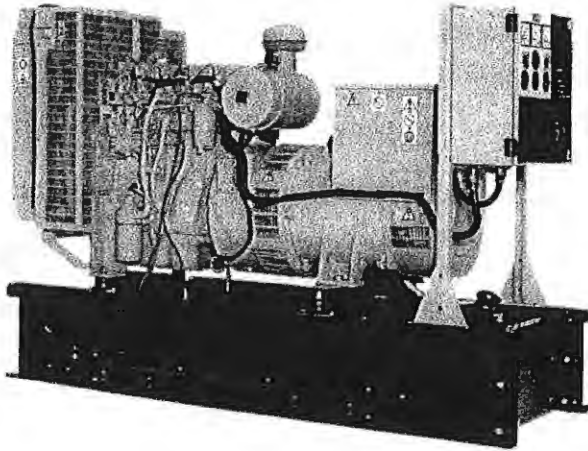
**CATERPILLAR / OLYMPIAN D40P3**

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- A. CATERPILLAR / OLYMPIAN D40P3 – 40KW GENERATOR SET DATA  
MOTOR STARTING CURVE  
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- C. 24 HOUR DUAL WALL FUEL TANK BASE**
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- J. WARRANTY**

**ANY OPTION INCLUDED WITH THIS PACKAGE WILL HAVE A BOX  
AROUND IT THROUGHOUT THIS SUBMITTAL**

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**STANDBY 40-60 kW**  
**PRIME 36-54.5 kW**  
60 Hz

Model	Standby kW (kVA)	Prime kW (kVA)
D40P3	40 (50)	<del>36 (45)</del>
D40P2*	40 (50)	36 (45)
D50P3	50 (62.5)	45 (56.3)
D50P2*	50 (62.5)	45 (56.3)
D60P3	60 (75)	54.5 (68.1)
D60P2*	60 (75)	54.5 (68.1)

\*EPA Approved, Emissions Certified

## FEATURES

### GENERATOR SET

- Complete system designed and built at ISO 9001 certified facilities
- Factory tested to design specifications at full load conditions

### ENGINE

- Governor, mechanical
- Electrical system, 12 VDC
- Cartridge type filters
- Battery(s), rack and cables
- Coolant and lube drains piped to edge of base

### GENERATOR

- Insulation system, class H
- Drip proof alternator air intake (NEMA 2, IP23)
- Electrical design in accordance with BS5000 Part 99, IEC34-1, VDE0530, UTE51100, NEMA MG-1.22

### CONTROL SYSTEM

- 2001 Series Autostart control panel
- Vibration isolated NEMA 1 enclosure with lockable hinged door
- DC and AC wiring looms

### MOUNTING ARRANGEMENT

- Heavy-duty fabricated steel base with lifting points
- Anti-vibration pads to ensure vibration isolation
- Complete OSHA guarding
- ~~Stub up pipe ready for connection to silencer pipework~~
- Flexible fuel lines terminated at skid base with NPT connections

### COOLING SYSTEM

- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 122° F (50° C)

### CIRCUIT BREAKER

- UL/CSA listed
- 3-pole with solid neutral
- NEMA 1 steel enclosure, vibration isolated
- Electrical stub-up area directly below circuit breaker

### AUTOMATIC VOLTAGE REGULATOR

- Voltage within ± 0.5% at steady state from no load to full load
- Provides fast recovery from transient load changes

### EQUIPMENT FINISH

- All electroplated hardware
- Anticorrosive paint protection
- High gloss polyurethane paint for durability and scuff resistance

### QUALITY STANDARDS

- BS4999, BS5000, BS5514, IEC34, VDE0530, NEMA MG-1.22, NFPA 110 (with optional equipment)

### DOCUMENTATION

- Operation and maintenance manuals provided **(1 SET)**
- Wiring diagrams included

### WARRANTY

- 12 months from date of initial start-up or 18 months from shipping, whichever occurs first

Materials and specifications are subject to change without notice.



STANDBY 40 - 60 kW  
 PRIME 30 - 54.5 kW  
 60 Hz

**OLYMPIAN™**

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**OPTIONAL EQUIPMENT\***

**ENCLOSURE**

- B Series weather protective enclosure (includes internal silencer system)
  - Single point lift
  - Panel viewing window
  - External emergency stop pushbutton
- Sound attenuated enclosure (includes internal silencer system)
- Super sound attenuated enclosure (includes internal silencer system)

**SILENCER SYSTEM — OPEN UNIT**

- Level 1 silencer
- Level 2 silencer
- Level 3 silencer
- Mounting kit
- Through-wall installation kits

**ENGINE**

- Electronic governor (fully adjustable)
- Battery heater
- Lube oil drain pump
- High lube oil temperature shutdown
- Lube oil sump heater

**GENERATOR**

- Anti-condensation heater
- Permanent magnet generator
- AREP excitation system
- Alternator upgrade 1 size

**CONTROL SYSTEM**

- No control system
- 4001 Autostart control panel
- 4001E Autostart control panel
- Access 4000 digital control panel

**MOUNTING ACCESSORIES**

- Seismic (Zone 4) vibration isolators

**FUEL SYSTEM**

- Single-walled plastic fuel tank
- UL listed closed top-diked skid-mounted fuel tank base (12/24-hour capacity) with fuel alarm (low level/leak detected)
- Critical high fuel alarm

**REMOTE ANNUNCIATORS**

- 8- and 16-channel remote annunciator panel (supplied loose)
- Remote annunciator upgrade normal/run control switch
- Remote annunciator upgrade lockdown emergency stop button

**COOLING SYSTEM**

- Coolant heater
- Low coolant temperature alarm
- Low coolant level shutdown
- Radiator transition flange

**MISCELLANEOUS ACCESSORIES**

- Toolkit
- Additional operator's manual pack
- Special enclosure color
- UL listing
- CSA certification
- French language labels

**EXTENDED WARRANTY**

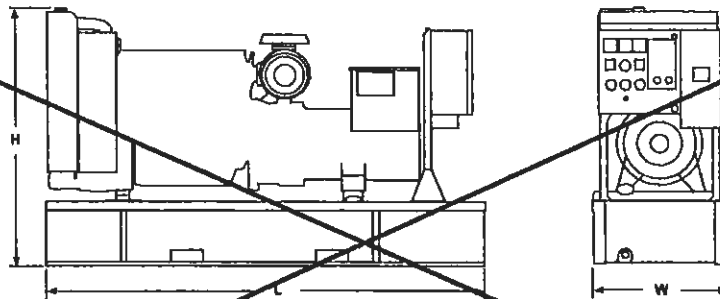
- 24 months
  - 36 months
  - 48 months
  - 60 months
- (See warranty policy for details of coverage)

**TESTING**

- Factory witness test (restricted to 6 hours — full load, 1.0 pf)

\*Some options may not be available on all models. Not all options are listed.

**GENERATOR SET DIMENSIONS AND WEIGHTS**



Model	Length in (mm)	Width in (mm)	Height in (mm)	Weight lbs (kg)**
D40P3	84.6 (2149)	29.6 (752)	52.8 (1341)	1804 (820)
D40P2	84.6 (2149)	29.6 (752)	52.8 (1341)	1804 (820)
D50P3	84.6 (2149)	29.6 (752)	52.8 (1341)	1881 (855)
D50P2	84.6 (2149)	29.6 (752)	52.8 (1341)	1881 (855)
D60P3	84.6 (2149)	29.6 (752)	52.8 (1341)	1991 (905)
D60P2	84.6 (2149)	29.6 (752)	52.8 (1341)	1991 (905)

NOTE: General configuration not to be used for installation. See specific dimensional drawings for detail.

\*\*Includes oil and coolant

Materials and specifications are subject to change without notice.

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**SPECIFICATIONS**

**GENERATOR**

Voltage Regulation ..... ±0.5% at steady state from no load to full load  
 Frequency ..... ±0.8% for constant load, no load to full load  
 Waveform Distortion ..... THD < 1.8%, at no load  
 Radio Interference ..... Compliance with BSEN 50081 and 50082  
 Telephone Interference ..... TIF <50, THF <2%  
 Overspeed Limit ..... 2250 rpm  
 Insulation ..... Class H  
 Temperature Rise ..... Within Class H limits  
 Available Voltages ..... 277/480, 266/460, 120/240, 127/220, 120/208, 247/600  
 Deration ..... Consult factory for available outputs  
 Ratings ..... At 86° F (30° C), 500 ft. (152.4 m), 60% humidity, 0.8 pf

**ENGINE**

Manufacturer ..... Perkins  
 Type ..... 4-Cycle  
 Cylinder Configuration ..... In-line 4  
 Displacement — cu in (L) ..... 243.5 (3.99)  
 Bore — in (mm) ..... 3.94 (100)  
 Stroke — in (mm) ..... 5.00 (127.0)  
 Governor  
 Type ..... Mechanical  
 Class ..... A1  
 Piston Speed — ft/sec (m/sec) ..... 25.0 (7.62)  
 Engine speed — rpm ..... 1800  
 Air Cleaner Type ..... Dry, replaceable paper element type with restriction indicator

**D40P3 — 1004G**

Aspiration ..... Natural  
 Compression Ratio ..... 16.0:1  
 Max Power at Rated rpm — hp (kW)  
 Standby ..... 72.4 (54)  
 Prime ..... 65.8 (49)  
 BMEP — psi (kPa)  
 Standby ..... 131 (902)  
 Prime ..... 119 (820)  
 Regenerative Power — kW ..... 10.5

**D40P2 — 1004GEPA**

Aspiration ..... Natural  
 Compression Ratio ..... 16.0:1  
 Max Power at Rated rpm — hp (kW)  
 Standby ..... 75.1 (56)  
 Prime ..... 67.6 (50.4)  
 BMEP — psi (kPa)  
 Standby ..... 136 (936)  
 Prime ..... 122 (842)  
 Regenerative Power — kW ..... 12.6

**D50P3, D60P3 — 1004TG2**

Aspiration ..... Turbocharged  
 Compression Ratio ..... 16.0:1  
 Max Power at Rated rpm — hp (kW)  
 Standby ..... 116.7 (87)  
 Prime ..... 106 (79)  
 BMEP — psi (kPa)  
 Standby ..... 210.7 (1453)  
 Prime ..... 191.4 (1320)  
 Regenerative Power — kW ..... 12.7

**D50P2, D60P2 — 1004-40T**

Aspiration ..... Turbocharged  
 Compression Ratio ..... 17.25:1  
 Max Power at Rated rpm — hp (kW)  
 Standby ..... 95.2 (71.0)  
 Prime ..... 86.6 (64.5)  
 BMEP — psi (kPa)  
 Standby ..... 172 (1185)  
 Prime ..... 156 (1076)  
 Regenerative Power — kW ..... 12.6

**CONTROL PANEL**

NEMA 1 steel enclosure with lockable hinged door  
 Vibration isolated mounted Autostart control panel  
 Single location customer connector point  
 Electrical stub-up area directly below control panel

**RATING DEFINITIONS**

**Standby** — Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO8528-3).

**Prime** — Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10 percent overload power for 1 hour in 12 hours.

Consult your Olympian representative for more information.

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**STANDBY** 40 kW  
**PRIME** 36 kW  
**60 Hz**



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**D40P3 (3-Phase)**

Materials and specifications are subject to change without notice.

Generator Set Technical Data — 1800 rpm/60 Hz		Standby	Prime
<b>Power Rating</b>	kW (kVA)	40 (50)	36 (45)
<b>Lubricating System</b> Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Cooler: Watercooled Oil Type Required: API CF-4 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	2.1 (8.1) 1.8 (6.9)	2.1 (8.1) 1.8 (6.9)
<b>Fuel System</b> Generator Set Fuel Consumption 100% Load 75% Load 50% Load	G/hr (L/hr) G/hr (L/hr) G/hr (L/hr)	3.78 (14.34) 2.83 (10.76) 1.89 (7.17)	3.43 (13.04) 2.58 (9.78) 1.72 (6.52)
<b>Engine Electrical System</b> Voltage/Ground: 12/Negative Battery Charging Alternator Ampere Rating	Amps	45	45
<b>Cooling System</b> Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Temperature to Engine Temperature Rise Across Engine Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H <sub>2</sub> O (m H <sub>2</sub> O) U.S. gal/hr (L/hr) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	4.14 (15.7) 6.7 (2.0) 1791 (6780) 158 (70) 13.8 (7.7) 2219 (39.0) 961 (16.4) 5.5 (4.1)	4.14 (15.7) 6.7 (2.0) 1791 (6780) 158 (70) 13.8 (7.7) 1991 (38.0) 853 (15.0) 5.5 (4.1)
<b>Air Requirements</b> Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Alternator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min) Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min)	111 (3.15) 7.9 (2.0) 9216 (261) 678 (19.2) 0.48 (0.120) 6886 (195)	12.5 (3.19) 7.9 (2.0) 9216 (261) 678 (19.2) 0.48 (0.120) 6886 (195)
<b>Exhaust System</b> Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m <sup>3</sup> /min) °F (°C)	1.5 (5) 343 (9.7) 1274 (690)	1.5 (5) 321 (9.09) 1130 (610)
<b>Generator Set Noise Rating*</b> (Without Attenuation) at 3 ft (1 m)	dB(A)	97	97

Alternator Technical Data		277/480V	266/460V	127/220V	120/240V 120/208V	347/600V
<b>Motor Starting Capability:</b> (kVA) (30% Voltage Dip)	Self Excited	99	91	84	75	N/A
	PM-Excited**	130	118	109	98	130
	AREP-Excited	130	118	109	98	130
<b>Full Load Efficiencies:</b>	Standby	89.1	89.1	88.8	88.3	89.1
	Prime	89.4	89.4	89.2	88.8	89.4
<b>Reactances (per unit):</b>  Reactances shown are applicable to the standby rating.	X <sub>d</sub>	2.63	2.87	3.13	3.51	2.63
	X' <sub>d</sub>	0.11	0.12	0.13	0.15	0.11
	X'' <sub>d</sub>	0.057	0.062	0.067	0.075	0.57
	X <sub>q</sub>	1.58	1.72	1.88	2.10	1.58
	X'' <sub>q</sub>	0.073	0.080	0.087	0.098	0.073
	X <sub>2</sub>	0.064	0.070	0.077	0.080	0.064
	X <sub>0</sub>	0.006	0.006	0.007	0.007	0.006
<b>Time Constants:</b>	t' <sub>d</sub> 50 ms	t'' <sub>d</sub> 5 ms	t' <sub>do</sub> 1164 ms	t <sub>a</sub> 10 ms		

\* dB(A) levels are for guidance only  
 \*\* With PMG Excited Option AR12

# OLYMPIAN™ GENERATORS

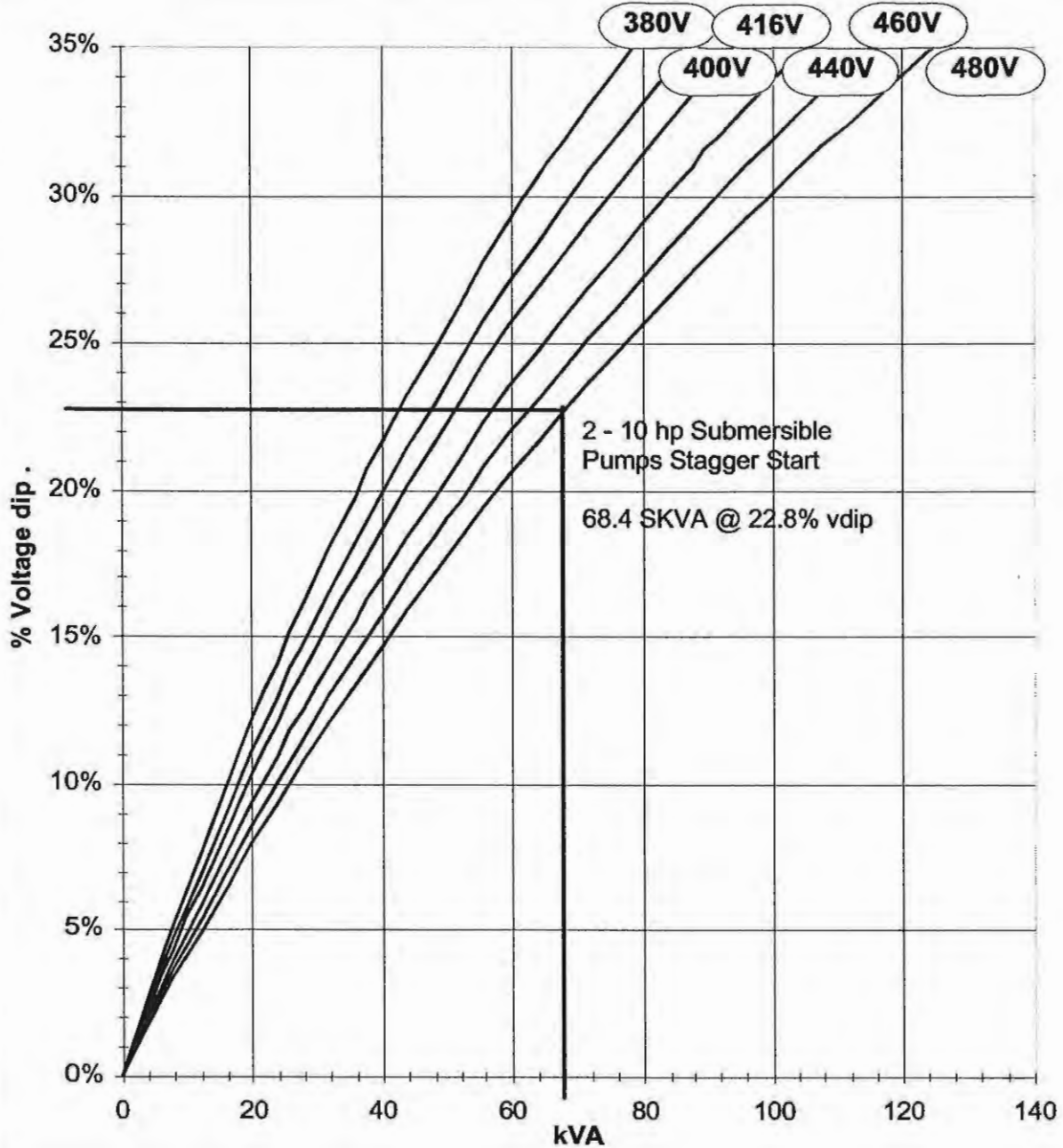
ELECTRICAL DATA - 3PH

FRAME LL 2014 B

Rev3 - 18 March 1999

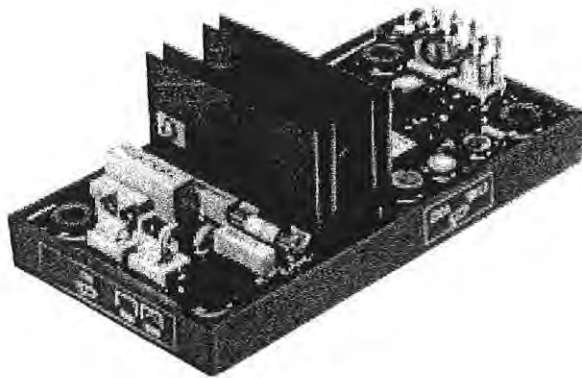
Ref :T20 - W574/B

## LOCKED ROTOR MOTOR STARTING CURVES 60Hz at 0,6 power factor



According to: I.E.C. 34.1/34.2 - U.T.E. : NF C 51.111 - V.D.E. 0530 - B.S. 4999 & 5000 - NEMA : MG 1 - 22  
The values indicated are typical values.  
In line with our policy of continuous product improvement, we reserve the right to change specifications without notice.

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## AUTOMATIC VOLTAGE REGULATOR - R230

The circuitry of the R230 Automatic Voltage Regulator (AVR) provides closed loop control of the generator output voltage by regulating the exciter field current. The R230 is powered by the shunt field excitation system and is fitted as standard on :

- 1000 Series generators
- 2000 Series generators
- 3000 Series generators

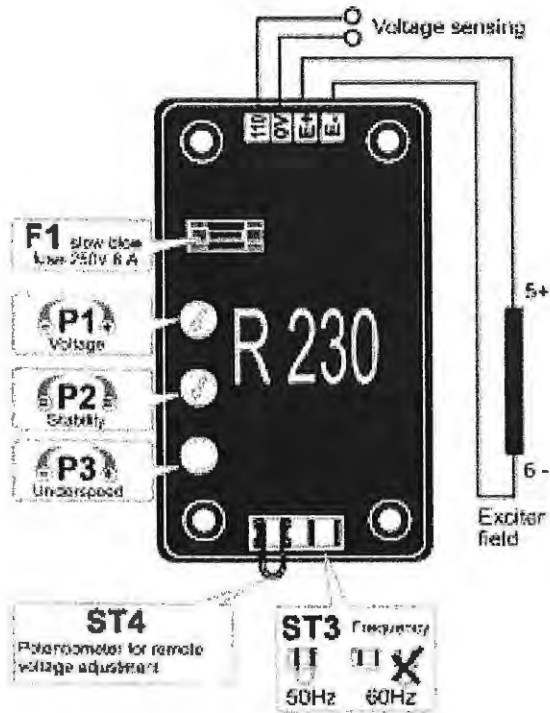
### SPECIFICATION

- Voltage regulation  $\pm 0.5\%$
- Voltage supply and sensing 85 to 139 volts (50/60 Hz)
- Rapid response time (500ms) for a transient voltage variation amplitude of  $\pm 20\%$
- Capable of remote voltage adjustment:  $\pm 5\%$

### ADJUSTMENT CAPABILITY

The R230 AVR features the following adjustment capabilities. (Please note that no adjustments should be made prior to careful consultation of the generator installation and maintenance manual)

- Generator output voltage adjustment
- Stability adjustment
- Underspeed threshold adjustment
- 50Hz or 60Hz frequency option
- Remote voltage adjustment option



Global Sourced

LEHX0479-03 (05/02)

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The International System of Units (SI) is used in this publication.

**HOMEFIELD PHASE III  
ON-SITE LIFT STATION**

**APPENDIX**

**SERIES S2 ACCESS DOOR DETAIL  
SERIES L1E LADDER EXTENSION DETAIL**

**MECHANICAL JOINTS &  
RETAINER GLANDS DETAILS  
FIBERGLASS UTILITY MARKER**

# SERIES S2S ACCESS DOOR

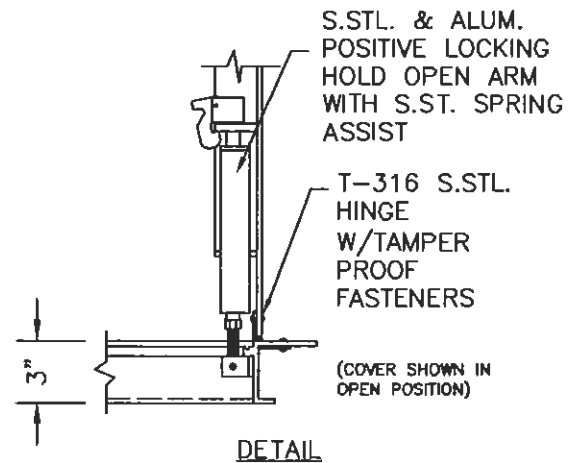
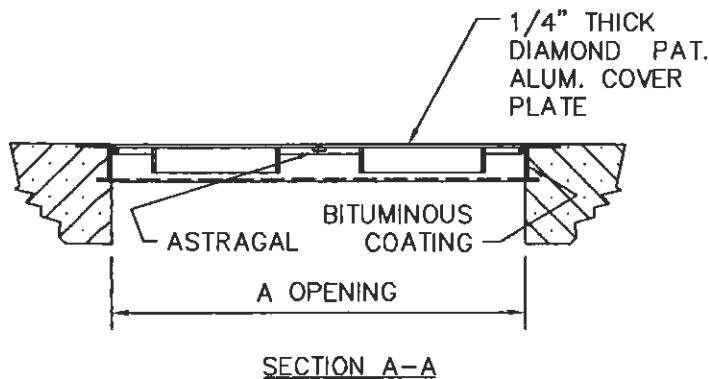
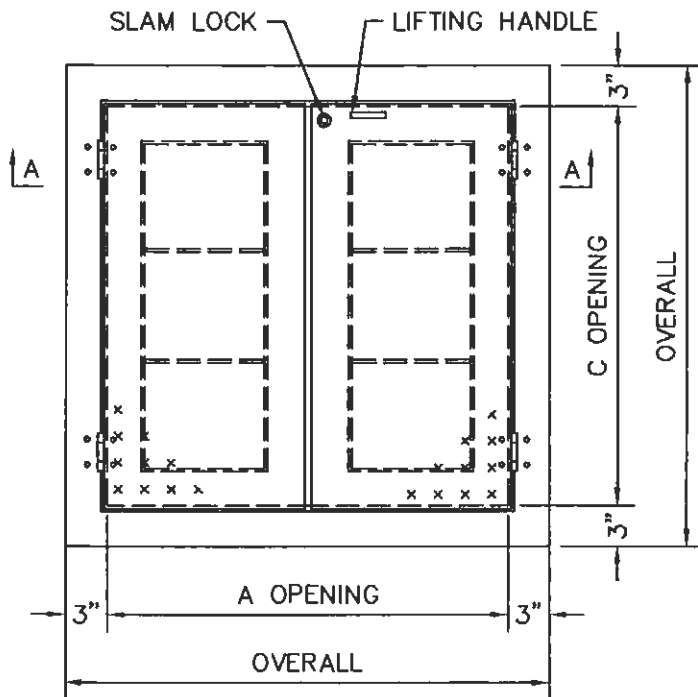
## STANDARD FEATURES:

- AUTO-LOCK T-316 STAINLESS STEEL HOLD OPEN ARM WITH RELEASE HANDLE
- T-316 STAINLESS STEEL HINGES AND ATTACHING HARDWARE
- T-316 STAINLESS STEEL SLAM LOCK W/REMOVABLE KEY
- STAINLESS STEEL COMPRESSION SPRING ASSIST
- BUILT-IN NEOPRENE CUSHION/GASKET
- NON-OZONE DEPLETING BITUMINOUS COATING
- DOUBLE LEAF CONSTRUCTION
- 300 LBS. PER SQ. FT. LOAD RATING
- EXTRUDED ALUMINUM FRAME
- RECESSED LIFTING HANDLE
- LIFETIME GUARANTEE



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 Fax 407-298-4534  
 Sales@HallidayProducts.com

QTY.	MODEL NO.	DIMENSIONS		UNIT WT. (LBS.)
		A	C	
	S2S4242	42"	42"	93
	S2S4842	48"	42"	99
	S2S4848	48"	48"	110
	S2S5442	54"	42"	108
	S2S5448	54"	48"	119
	S2S5454	54"	54"	127
	S2S6030	60"	30"	87
	S2S6036	60"	36"	100
	S2S6042	60"	42"	115
	S2S6048	60"	48"	130
	S2S6054	60"	54"	143
	S2S6060	60"	60"	158
	S2S6636	66"	36"	109
	S2S6648	66"	48"	141
	S2S7236	72"	36"	116
	S2S7242	72"	42"	135
	S2S7248	72"	48"	151
	S2S7254	72"	54"	168
	S2S7260	72"	60"	178



# SERIES L1E LADDER EXTENSION

## STANDARD FEATURES:

- EASY TO INSTALL ON ALUMINUM OR STAINLESS LADDERS
- SECURE LOCKING IN THE EXTENDED POSITION
- LIGHT WEIGHT OPERATION
- ALL ALUMINUM AND STAINLESS STEEL CONSTRUCTION
- ALSO AVAILABLE IN ALL TYPE 304 OR TYPE 316 S.STL.



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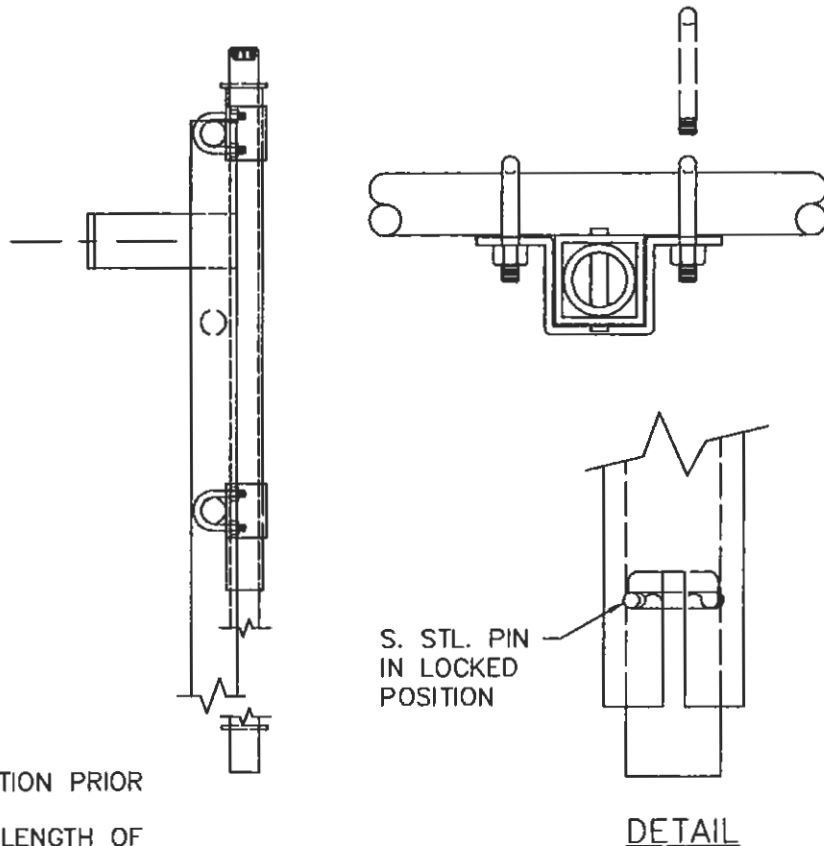
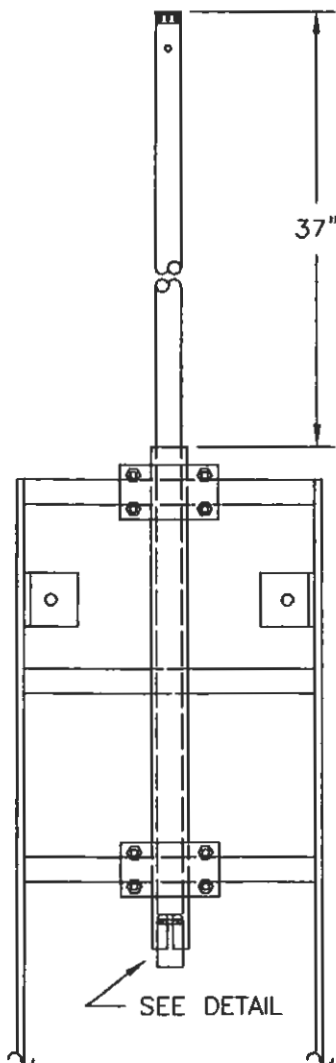
## INSTALLATION & OPERATION INSTRUCTIONS

### Installation:

- Place ladder flat on the ground with standoffs down.
- Place 2" square aluminum tube in center of rungs with the "T" shaped slot below third rung as shown.
- Place stainless steel channel clamp over square aluminum tube so "U" clamp holes line up on either side of rungs as shown.
- Insert stainless steel "U" bolts over rung and through holes in stainless steel channel clamp as shown.
- Apply 10-15 foot pounds of torque to all "U" bolt nuts.
- Verify that square aluminum tube is secured to ladder rungs.

### Operation:

- To engage ladder extension, grasp aluminum post above the top stainless steel channel clamp, and pull straight up until lower stainless steel pin is seated.
- Rotate aluminum post 1/4 turn in either direction to secure pin in slot as shown in Detail.



NOTES:  
PIN MUST BE IN LOCKED POSITION PRIOR TO OPERATION.  
REQUIRES A MINIMUM LADDER LENGTH OF 6 FEET.

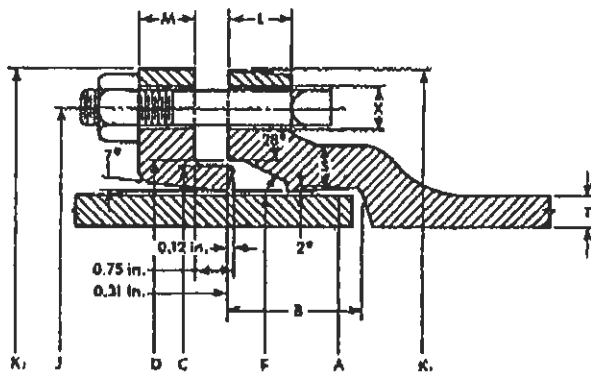


# MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

**Tyler Pipe**  
Subsidiary of  
Tyler Corporation



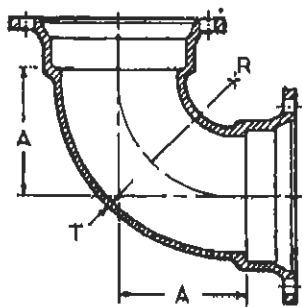
3" through 16" Mechanical Joint Ductile Iron Fittings shall be produced in strict accordance with all applicable terms and provisions of ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11. 18" thru 24" diameters shall be manufacturer's standards with wall thickness equivalent to Class 56 ductile iron pipe. The working pressure rating shall be 350 PSI. Cement-lining meets ANSI/AWWA C104/A21.4-85. (Furnished when required.)



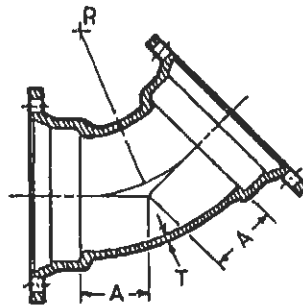
**Joint Dimensions in Inches**

Size	A Dia.	B	C Dia.	D Dia.	F Dia.	J Dia.	K <sub>1</sub> Dia.	K <sub>1</sub> Dia.	L	M	S	T	X Dia.	Bolt Size	Bolt No.
3	3.96	2.50	4.84	4.94	4.06	6.19	7.62	7.69	.59	.62	.38	.34	3/4	3/4 x 3	4
4	4.80	2.50	5.92	6.02	4.90	7.50	9.06	9.12	.60	.75	.41	.35	3/4	3/4 x 3 1/2	4
6	6.90	2.50	8.02	8.12	7.00	9.50	11.06	11.12	.63	.88	.43	.37	3/4	3/4 x 3 1/2	6
8	9.05	2.50	10.17	10.27	9.15	11.75	13.31	13.37	.66	1.00	.45	.39	3/4	3/4 x 3 1/2	6
10	11.10	2.50	12.22	12.34	11.20	14.00	15.62	15.62	.70	1.00	.47	.41	3/4	3/4 x 3 1/2	8
12	13.20	2.50	14.32	14.44	13.30	16.25	17.88	17.88	.73	1.00	.49	.43	3/4	3/4 x 3 1/2	8
14	15.30	3.50	16.40	16.54	15.44	18.75	20.31	20.25	.79	1.25	.56	.51	3/4	3/4 x 4	10
16	17.40	3.50	18.60	18.64	17.54	21.00	22.56	22.50	.85	1.31	.57	.52	3/4	3/4 x 4	12
18	19.50	3.50	20.60	20.74	19.64	23.25	24.83	24.75	1.00	1.38	.68	.59	3/4	3/4 x 4	12
20	21.60	3.50	22.70	22.84	21.74	25.50	27.08	27.00	1.02	1.44	.69	.60	3/4	3/4 x 4	14
24	25.80	3.50	26.90	27.04	25.94	30.00	31.58	31.50	1.02	1.56	.75	.62	3/4	3/4 x 4 1/2	16

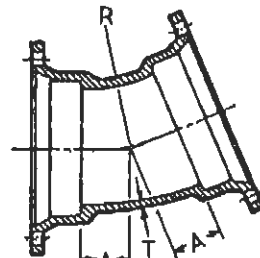
**BENDS**



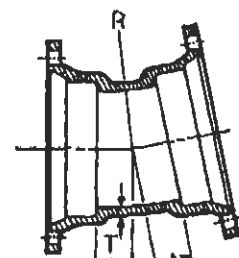
**90° Bends (1/4)**  
5-600



**45° Bends (1/8)**  
5-605



**22 1/2° Bends (1/16)**  
5-609



**11 1/4° (1/32)**  
5-611

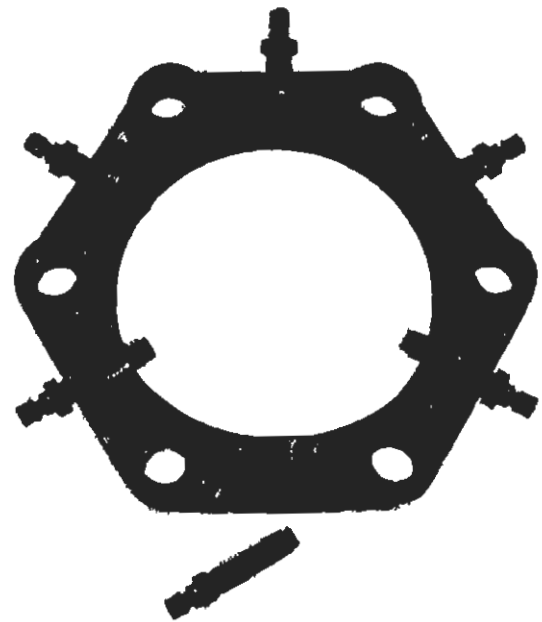
Size	Dimensions			Weights	Dimensions			Weights	Dimensions			Weights	Dimensions			Weights
	T	A	R		A	R	A		R	A	R					
3	.34	4.5	4	20	2.00	3.62	16	1.50	4.98	15	1.25	7.62	15			
4	.35	5.0	4.5	26	2.49	4.81	22	1.82	6.66	21	1.55	10.7	20			
6	.37	6.5	6	48	3.50	7.25	38	2.59	10.5	37	1.81	13.26	33			
8	.39	7.5	7	68	4.00	8.44	59	2.85	11.8	51	2.06	15.8	48			
10	.41	9.5	9	107	5.01	10.88	81	3.35	14.35	67	2.32	18.36	61			
12	.43	10.5	10	141	5.98	13.25	111	3.86	16.9	80	2.56	20.9	79			
14	.51	12.0	11.5	220	5.50	12.06	164	3.93	17.25	148	2.59	21.25	131			
16	.52	13.0	12.5	264	5.98	13.25	202	3.98	17.5	179	2.62	21.5	159			
18	.59	15.5	14.0	410	7.5	14.5	289	7.5	30.19	292	7.5	60.94	292			
20	.60	17.0	15.5	505	8.0	16.88	348	8.5	35.19	364	8.5	71.07	377			
24	.62	20.0	18.5	695	9.0	18.12	475	9.0	37.69	460	9.0	76.12	...			

\*18" thru 24" not included in AWWA C153 as of September, 1988.

**Tyler Pipe**Subsidiary of  
Tyler Corporation**TYLER DUCTILE IRON  
MECHANICAL JOINT RETAINER GLANDS****SAMPLE SPECIFICATION**

Mechanical joint retainer glands shall be cast from ductile iron no less than grade 70-50-5 and shall comply with all applicable provisions of AWWA/ANSI C110/A21.10 and C111/A21.11. Set screws shall be 5/8" NC thread, with torque-set head, or 5/8" square head bolts, with knurled cup-point, made of 4140 steel and shall be hardened to Rockwell "C" scale 45-47. (Either set screw can be used on 3"-12" size; 5/8" square head required for 14"-30".)

**Wall Thickness Note:** Installation suggestions are based on use with class 53 ductile iron pipe; results may vary if different classes or other pipe is used.

**LISTINGS**

All sizes are listed by UL (Underwriters' Laboratory); 24M7.

**PHYSICAL DESCRIPTION**

GLAND SIZE <sup>1</sup>	WEIGHT POUNDS	SET SCREWS REQUIRED	SET SCREW SIZES	TEE BOLTS REQUIRED <sup>2</sup>	TEE BOLTS SIZES
3	5.0	4	5/8 x 2 1/2	4	3/4 x 3
4	8.5	4	5/8 x 2 1/2	4	3/4 x 3 1/2
6	14.3	6	5/8 x 2 1/2	6	3/4 x 3 1/2
8	17.4	9	5/8 x 2 1/2	6	3/4 x 4
10	23.0	16	5/8 x 2 1/2	8	3/4 x 4
12	27.5	16	5/8 x 2 1/2	8	3/4 x 4
14	44.5	20	5/8 x 3 1/4	10	3/4 x 4 1/2
16	54.0	24	5/8 x 3 1/4	12	3/4 x 4 1/2
18	62.0	24	5/8 x 3 1/4	12	3/4 x 4 1/2
20	76.0	28	5/8 x 3 1/4	14	3/4 x 4 1/2
24	103	32	5/8 x 3 1/4	16	3/4 x 5
30	180	40	3/4 x 4	20	1 x 6

1. Made for centrifugally - cast ductile iron or cast iron pipe.

2. Specify tee bolts and gaskets when required; these not normally supplied as parts of retainer gland.

**APPLICATION DATA**

GLAND SIZE	FITS PIPE O.D. INCHES	WORKING PRESSURE PSI	SET SCREW TORQUE, FT. LBS.	TEE BOLT TORQUE, FT. LBS. <sup>3</sup>	PERMISSIBLE DEFLECTION 0° PER JOINT
3	3.96	350	90	45-60	2°
4	4.80	350	90	75-90	2°
6	6.90	350	90	75-90	2°
8	9.05	350	90	75-90	2°
10	11.10	250	90	75-90	2°
12	13.20	250	90	75-90	2°
14	15.30	250	90	75-90	1°
16	17.40	200	90	75-90	1°
18	19.50	200	90	75-90	1°
20	21.60	200	110	75-90	1°
24	25.80	150	110	75-90	1°
30	32.00	150	200	75-90	1°

3. AWWA recommendation

## CARSONITE UTILITY MARKER

## CARSONITE CURV-FLEX® MARKER

# MARKING PRODUCTS

For high visibility and easy identification of underground utility lines, the Carsonite Utility Marker is the perfect choice. This trademarked three-rail design combines structural integrity with above-ground flexibility, as well as protection for decals. Easy to install and lightweight for ease of transportation in the field. Because it's virtually impossible to remove without proper equipment, the Carsonite Utility Marker is highly resistant to vandals. Carsonite's composite material will survive multiple gunshots without significant loss of legibility or damage to the post. Add custom or standard decals for a visible identification of buried utility lines, day or night.

Our most flexible marker available. Recommended for areas where vehicle impacts are likely. The trade-marked curve and flange profile along with special fiberglass reinforced material allows this marker to withstand direct tire impacts and return to its original upright position. Often used to mark culverts, utility lines, fire hydrants and electrical station outlets. Use for either single or dual-sided identification.

Carsonite International has a long-standing reputation for quality. As the industry leader for over 20 years, Carsonite International is committed to providing its customers with the finest made marking products available anywhere.



### SPECIFICATIONS

Fiberglass reinforced composite	<b>MATERIAL</b>	Fiberglass reinforced composite
3.75" (99mm)	<b>WIDTH</b>	4" (102mm)
62", 66", 72", 78" (1.575, 1.676, 1.829, 1.981m)	<b>LENGTHS</b>	62", 66", 72", 78" (1.575, 1.676, 1.829, 1.981m)
2.5 lbs (62") 1.134kg (1.575m)	<b>WEIGHT</b>	1.9 lbs (62") 862g (1.575m)
White (01), Yellow (02), Orange (04), Red (05), Green (07), Blue (08)	<b>COLORS</b>	White (01), Yellow (02), Orange (04), Red (05), Green (07), Blue (08)
CRM30	<b>PRODUCT #</b>	CFR40

Installation Tools: See page 28.

Installation Tools: See page 28.

Introductory kit available. See page 29.

CALL TOLL FREE 1-800-648-7917

