



HEAVY DUTY PORTABLE DVD_DVS PRODUCT INFORMATION

Heavy Duty, Portable, Single & Dual Output DV Chargers: Models: Single: 12V20A Dual: 12V20A



**The Battery Tender®
Heavy Duty, Portable
Dual Output DVD-40
12 Volt, 20 Amp**

**The Battery Tender®
Heavy Duty, Portable
Single Output
DVS-20**

12 Volt, 20 Amp



GENERAL DESCRIPTION: The single and dual channel, heavy duty, portable chargers have been employed in the Marine industry for a number of years. They are linear power converters that have an effective DC output at a maximum power level of approximately 300 or 600 watts. All output channels have a 12V nominal output voltage with a maximum charging current of 20A (DVS-20, single or DVD-40, dual). Also, a variety of software configurations are available: DELCO; Standard; Sealed, VRLA, GRT, AGM (Hawker/Optima); and GEL.

OUTPUT CABLE CONNECTIONS: The DVS and DVD chargers all have jumper cable type output harnesses with heavy-duty alligator clamps.

STATUS INDICATOR LIGHTS: The indicator lights are located in a horizontal row, 1 green light, and 5 red lights. Single channel chargers have only one row of lights, and dual channel chargers have two rows of lights. Each channel on a dual charger is completely independent from the other, so the indication on either row of lights may be different at any given time. The following describes the operation of the status indicator lights:



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- **GREEN** - When the green light is on and not flashing, the charger is ready to begin charging the battery normally. After only a few seconds, the green light will turn off and gradually; each of the 5 red lights will begin to come on. This is an indication that the charger is charging the battery normally.
- **RED** - When the red lights turn on and do not flash, the battery is being recharged normally. You will notice a number below each red light: 4, 8, 12, 16, or 20. These numbers represent how much current the charger is delivering to the battery. If all 5 red lights are on, then the charger is delivering between 16 and 20 amps to the battery. As the red lights begin to turn off, gradually, from right to left, then the battery is becoming fully charged and it is drawing less current from the charger.
- **GREEN FLASHING** - When the green light is flashing, the charge cycle is complete, and the battery charger is in the storage mode of charge. In this mode the charger will maintain the battery at full charge.
- **RED FLASHING** - When the red lights are flashing, the charger is experiencing some type of abnormal condition. For example, the battery is not accepting charge current at the correct level that corresponds to its voltage, or there could be a faulty connection between the charger and the battery.

SPECIAL TROUBLESHOOTING INFORMATION:

- 1) **NONE OF THE CHARGER STATUS INDICATOR LIGHTS TURN ON:**
 - a) Disconnect the charger AC power plug from the AC outlet and recheck that the battery charger alligator clips are connected to the correct polarity battery terminals and that they are making a clean, tight connection.
 - b) Check to make sure that the AC outlet is supplying power by plugging in another appliance like a lamp, or check the outlet voltage with a voltmeter.
- 2) **AFTER THE STORAGE/FLOAT MAINTENANCE STATUS INDICATOR LIGHT (GREEN LIGHT FLASHING) HAS BEEN ON, THE RED LIGHTS BEGIN TO COME ON.**
 - a) This is **NORMAL OPERATION** for the Heavy Duty Chargers.
 - b) There has been a momentary AC power outage that reset the charge cycle.
 - c) There is some other load or appliance drawing power from the battery. When the battery voltage drops below 12.0V to 12.5V, the charge cycle resets

ADDITIONAL TROUBLESHOOTING INFORMATION: If the **CHARGER DOES NOT TURN ON:** Turn off the power switch and then remove the charger AC plug from the power outlet. Check the fuse located in a fuse-holder on the rear panel of the charger. If the fuse is defective, replace it. All heavy-duty chargers use a Cartridge type, 250 Volt, Ceramic, Fast Blow, 0.25 inch by 1.25 inch. For the DVS-20, the fuse rating is 10 amps and for the DVD-40, the fuse rating is 15 amps. For example, Bussman part numbers ABC-10 and ABC-15.



**HEAVY DUTY PORTABLE DVD_DVS
PRODUCT INFORMATION**

Heavy Duty Portable Charger, Single 12V20A, DVS-20, STD		
Charger Specification Summary		
SOFTWARE:	STANDARD	
Deltran Part Number:	021-0099	
Nominal Output:		
	DELCO Mode	Other Mode
Voltage:	12 Volts	12 Volts
Current:	20 Amps	20 Amps
Input Voltage:	85 to 130 VAC	
Input Frequency:	57 to 63 Hz	
Total Maximum Input Current:	9.8 Arms	
Nominal Efficiency:	60%	
Nominal Power Factor:	0.6	
Charger Output:		
Maximum Power: (+/- 3%) @ 25 °C	300 Watts	
Maximum Current: During Bulk Charge	20 Amps	
Absorption Voltage:	NA	14.56 VDC = (2.43 vpc)
Note: When operating in the Delco mode, the output current is a true constant current. There is no absorption period because the constant current does not terminate until the battery voltage reaches the equalization level. When operating in the Other mode, the constant current is terminated at a lower, absorption voltage level.		
Equalization Voltage:	16.25 (2.71 vpc)	16.58 (2.76 vpc)
Float Voltage:	13.5 VDC = (2.25 vpc)	13.5 VDC = (2.25 vpc)
Charge Reset: Battery Voltage Threshold	12 to 12.5 VDC (2 to 2.08 vpc)	12 to 12.5 VDC (2 to 2.08 vpc)
Output Regulation:		
Line (Typical):	1%	
Electrical Isolation:		
Input / Output:	1500 VAC	
Input / Chassis:	1500 VAC	
Output / Chassis:	500 VAC	
Operating Temp:	-20°C to 50°C	
Dimensions:	9.0 in(229 mm)L x 6.75 in(172 mm)W x 6.75 in(172 mm)H	
Weight:	19 lb.	
Carton Size:	16.0 in(407 mm)L x 12 in(305)W x 10 in(254 mm)H	
Shipping Weight:	20 lbs.	
Enclosure:	Powder Coated Aluminum Chassis	
Special Features:		
Short Circuit Protection:	YES	
Reverse Polarity Protection:	YES	
Spark Proof:	NO	
Temperature Compensation:	NO	
Agency Listings: UL, ETL, CSA, etc.	Designed to meet UL-1236 and CSA 22.2 Contact the office in DeLand, FL for information on agency listings. Phone: 386-736-7900	

Table 1 Spec Sheet: Heavy Duty DVS-20, Single 12V20A Standard



HEAVY DUTY PORTABLE DVD_DVS PRODUCT INFORMATION

Heavy Duty Portable Charger, Single 12V20A, DVS-20, AGM		
Charger Specification Summary		
SOFTWARE:	Sealed/VRLA/GRT/AGM (Valve Regulated Lead Acid / Gas Recombinant Technology /Absorbed Glass Matte)	
Deltran Part Number:	021-0136	
Nominal Output:		
	DELCO Mode	Hawker (GRT/AGM)
Voltage:	12 Volts	12 Volts
Current:	20 Amps	20 Amps
Input Voltage:	85 to 130 VAC	
Input Frequency:	57 to 63 Hz	
Total Maximum Input Current:	9.8 Arms	
Nominal Efficiency:	60%	
Nominal Power Factor:	0.6	
Charger Output:		
Maximum Power: (+/- 3%) @ 25 °C	300 Watts	
Maximum Current: During Bulk Charge	20 Amps	
Absorption Voltage:	NA	14.7 VDC = (2.45 vpc)
Note: When operating in the Delco mode, the output current is a true constant current. There is no absorption period because the constant current does not terminate until the battery voltage reaches the equalization level. When operating in the GRT/AGM mode, the constant current is terminated at a lower, absorption voltage level.		
Equalization Voltage:	16.25 (2.71 vpc)	15.6 VDC (2.60 vpc)
Float Voltage:	13.5 VDC = (2.25 vpc)	13.6 VDC = (2.27 vpc)
Charge Reset: Battery Voltage Threshold	12 to 12.5 VDC (2 to 2.08 vpc)	12 to 12.5 VDC (2 to 2.08 vpc)
Output Regulation:		
Line (Typical):	1%	
Electrical Isolation:		
Input / Output:	1500 VAC	
Input / Chassis:	1500 VAC	
Output / Chassis:	500 VAC	
Operating Temp:	-20°C to 50°C	
Dimensions:	9.0 in(229 mm)L x 6.75 in(172 mm)W x 6.75 in(172 mm)H	
Weight:	19 lb.	
Carton Size:	16.0 in(407 mm)L x 12 in(305)W x 10 in(254 mm)H	
Shipping Weight:	20 lbs.	
Enclosure:	Powder Coated Aluminum Chassis	
Special Features:		
Short Circuit Protection:	YES	
Reverse Polarity Protection:	YES	
Spark Proof:	NO	
Temperature Compensation:	NO	
Agency Listings: UL, ETL, CSA, etc.	Designed to meet UL-1236 and CSA 22.2 Contact the office in DeLand, FL for information on agency listings. Phone: 386-736-7900	

Table 2 Spec Sheet: Heavy Duty DVS-20, Single 12V20A AGM



HEAVY DUTY PORTABLE DVD_DVS PRODUCT INFORMATION

Heavy Duty Portable Charger, Dual 12V20A, DVD-40, STD		
Charger Specification Summary		
SOFTWARE:	STANDARD	
Deltran Part Number:	021-0102	
Nominal Output:		
	DELCO Mode	Other Mode
Voltage:	12 Volts	12 Volts
Current:	20 Amps	20 Amps
Input Voltage:	85 to 130 VAC	
Input Frequency:	57 to 63 Hz	
Total Maximum Input Current:	19.6 Arms	
Nominal Efficiency:	60%	
Nominal Power Factor:	0.6	
Charger Output:		
Maximum Power: (+/- 3%) @ 25 °C	300 Watts per Channel 600 Watts Total	
Maximum Current: During Bulk Charge	20 Amps per Channel 40 Amps Total	
Absorption Voltage:	NA	14.56 VDC = (2.43 vpc)
Note: When operating in the Delco mode, the output current is a true constant current. There is no absorption period because the constant current does not terminate until the battery voltage reaches the equalization level. When operating in the Other mode, the constant current is terminated at a lower, absorption voltage level.		
Equalization Voltage:	16.25 (2.71 vpc)	16.58 (2.76 vpc)
Float Voltage:	13.5 VDC = (2.25 vpc)	13.5 VDC = (2.25 vpc)
Charge Reset: Battery Voltage Threshold	12 to 12.5 VDC (2 to 2.08 vpc)	12 to 12.5 VDC (2 to 2.08 vpc)
Output Regulation:		
Line (Typical):	1%	
Electrical Isolation:		
Input / Output:	1500 VAC	
Input / Chassis:	1500 VAC	
Output / Chassis:	500 VAC	
Operating Temp:	-20°C to 50°C	
Dimensions:	11.75 in(299 mm)L x 9.0 in(229 mm)W x 6.75 in(172 mm)H	
Weight:	28 lb.	
Carton Size:	16.0 in(407 mm)L x 12 in(305)W x 10 in(254 mm)H	
Shipping Weight:	29 lbs.	
Enclosure:	Powder Coated Aluminum Chassis	
Special Features:		
Short Circuit Protection:	YES	
Reverse Polarity Protection:	YES	
Spark Proof:	NO	
Temperature Compensation:	NO	
Agency Listings: UL, ETL, CSA, etc.	Designed to meet UL-1236 and CSA 22.2 Contact the office in DeLand, FL for information on agency listings. Phone: 386-736-7900	

Table 3 Spec Sheet: Heavy Duty DVD-40, Dual 12V20A Standard



HEAVY DUTY PORTABLE DVD_DVS PRODUCT INFORMATION

Heavy Duty Portable Charger, Dual 12V20A, DVD-40, AGM		
Charger Specification Summary		
SOFTWARE:	Sealed/VRLA/GRT/AGM (Valve Regulated Lead Acid / Gas Recombinant Technology /Absorbed Glass Matte)	
Deltran Part Number:	021-0138	
Nominal Output:		
	DELCO Mode	Hawker (GRT/AGM) Mode
Voltage:	12 Volts	12 Volts
Current:	20 Amps	20 Amps
Input Voltage:	85 to 130 VAC	
Input Frequency:	57 to 63 Hz	
Total Maximum Input Current:	19.6 Arms	
Nominal Efficiency:	60%	
Nominal Power Factor:	0.6	
Charger Output:		
Maximum Power: (+/- 3%) @ 25 °C	300 Watts per Channel 600 Watts Total	
Maximum Current: During Bulk Charge	20 Amps per Channel 40 Amps Total	
Absorption Voltage:	NA	14.7 VDC = (2.45 vpc)
Note: When operating in the Delco mode, the output current is a true constant current. There is no absorption period because the constant current does not terminate until the battery voltage reaches the equalization level. When operating in the GRT/AGM mode, the constant current is terminated at a lower, absorption voltage level.		
Equalization Voltage:	16.25 (2.71 vpc)	15.6 VDC (2.60 vpc)
Float Voltage:	13.5 VDC = (2.25 vpc)	13.6 VDC = (2.27 vpc)
Charge Reset: Battery Voltage Threshold	12 to 12.5 VDC (2 to 2.08 vpc)	12 to 12.5 VDC (2 to 2.08 vpc)
Output Regulation:		
Line (Typical):	1%	
Electrical Isolation:		
Input / Output:	1500 VAC	
Input / Chassis:	1500 VAC	
Output / Chassis:	500 VAC	
Operating Temp:	-20°C to 50°C	
Dimensions:	11.75 in(299 mm)L x 9.0 in(229 mm)W x 6.75 in(172 mm)H	
Weight:	28 lb.	
Carton Size:	16.0 in(407 mm)L x 12 in(305)W x 10 in(254 mm)H	
Shipping Weight:	29 lbs.	
Enclosure:	Powder Coated Aluminum Chassis	
Special Features:		
Short Circuit Protection:	YES	
Reverse Polarity Protection:	YES	
Spark Proof:	NO	
Temperature Compensation:	NO	
Agency Listings: UL, ETL, CSA, etc.	Designed to meet UL-1236 and CSA 22.2 Contact the office in DeLand, FL for information on agency listings. Phone: 386-736-7900	

Table 4 Spec Sheet: Heavy Duty DVD-40, Dual 12V20A AGM



High Power Portable: DV Chargers: 12V20A Models:

12V20A DELCO:

Stage 1) Bulk Charge: Red Lights On, Constant Current = 20.0 Amps, Transition to Stage 2, Absorption Charge when battery voltage reaches 16.25 VDC.

Stage 2) Absorption & Equalization Charge: Red Lights On, the number of red lights will decrease as the charge current drops in 4 amp increments. Absorption Voltage = 16.25 VDC Transition to Float Charge after 2 hours has elapsed.

Stage 3) There is no separate Equalization Charge mode, since the absorption voltage is so high for Delco batteries it performs the equalization function also.

Stage 4) Float Charge: Red Lights Off, Green Light On and Flashing. Float Voltage = 13.4 VDC. If an external load is applied to the battery while the charger is in stage 4, Float Charge, and if the battery voltage drops below a range between 12.0 to 12.5 VDC, then the charge cycle restarts.

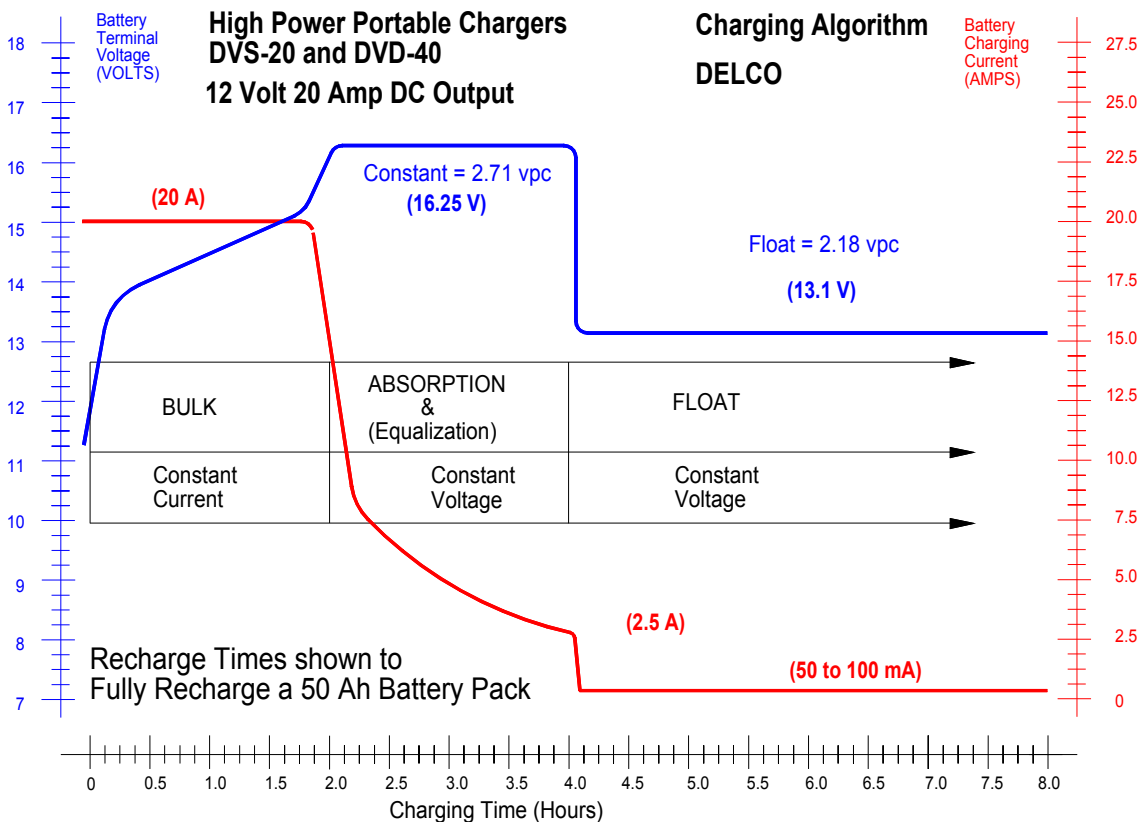


Figure 1 Chg Graph: DV High Pwr Portables: 12V20A DELCO



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12V20A OTHER:

Stage 1) Bulk Charge: Red Lights On, Constant Current = 20.0 Amps, Transition to Stage 2, Absorption Charge when battery voltage reaches 14.55 VDC.

Stage 2) Absorption Charge: Red Lights On, the number of red lights will decrease as the charge current drops in 4 amp increments. Absorption Voltage = 14.55 VDC
Transition to Equalization Charge when the charge current drops to 2.0 amps, typically 30 minutes or less.

Stage 3) Equalization Charge: Equalization Voltage depends on the battery's response to a constant = 2.0 amps. Typically, the battery voltage will rise to 16.25 to 16.5 VDC.

Stage 4) Float Charge: Red Lights Off, Green Light On and Flashing. Float Voltage = 13.1 VDC. If an external load is applied to the battery while the charger is in stage 4, Float Charge, and if the battery voltage drops below a range between 12.0 to 12.5 VDC, then the charge cycle restarts.

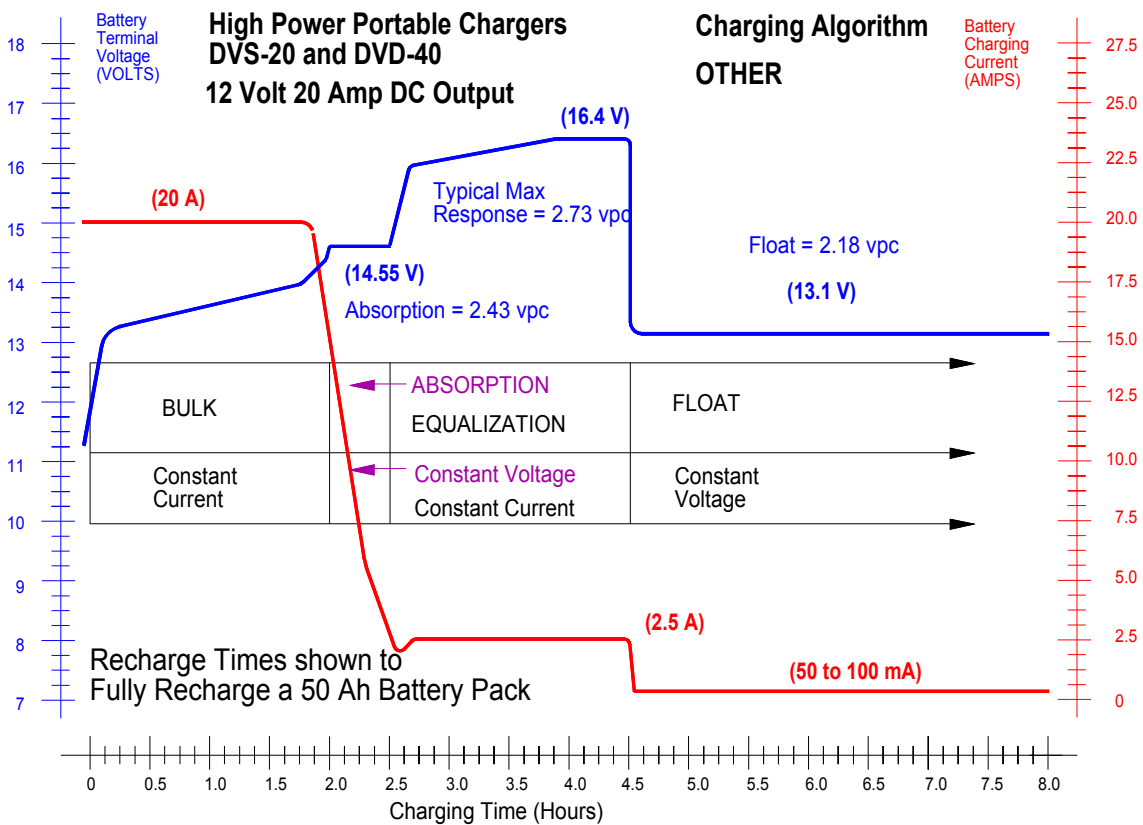


Figure 2 Chg Graph: DV High Pwr Portables: 12V20A OTHER



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12V20A AGM (Hawker/Optima): Adaptive 4-Step:

Stage 1) Bulk Charge: Red Lights On, Constant Current = 20.0 Amps, Transition to Stage 2, Absorption when battery voltage reaches 14.9 VDC.

Stage 2) Absorption Charge: Red Lights On, Absorption Voltage = 14.9 VDC. Set Absorption Timer when charge current drops to 18 amps. This is approximately the same time that the voltage reaches 14.9 VDC. The Absorption Timer length is computed as a function of the time it takes to complete Bulk Charge. Absorption Charge Time = 1.5 x Bulk Charge Time. Transition to Equalization Charge when Absorption Timer resets.

Stage 3) Equalization Charge: Red Lights On, Equalization Voltage Limit = 15.6 VDC. Set Equalization Timer equal to 0.5 x Bulk Charge Time. Charge current is constant at 2 amps until the battery reaches the equalization voltage limit. Then the voltage is held constant at 15.6 VDC and the current gradually decreases. Transition to Float Charge when Equalization Timer resets.

Stage 4) Float Charge: Red Lights Off, Green Light Flashing. Float Voltage = 13.6 VDC. If an external load is applied to the battery while the charger is in stage 4, Float Charge, and if the battery voltage drops below a range between 12.0 to 12.5 VDC, then the charge cycle restarts.

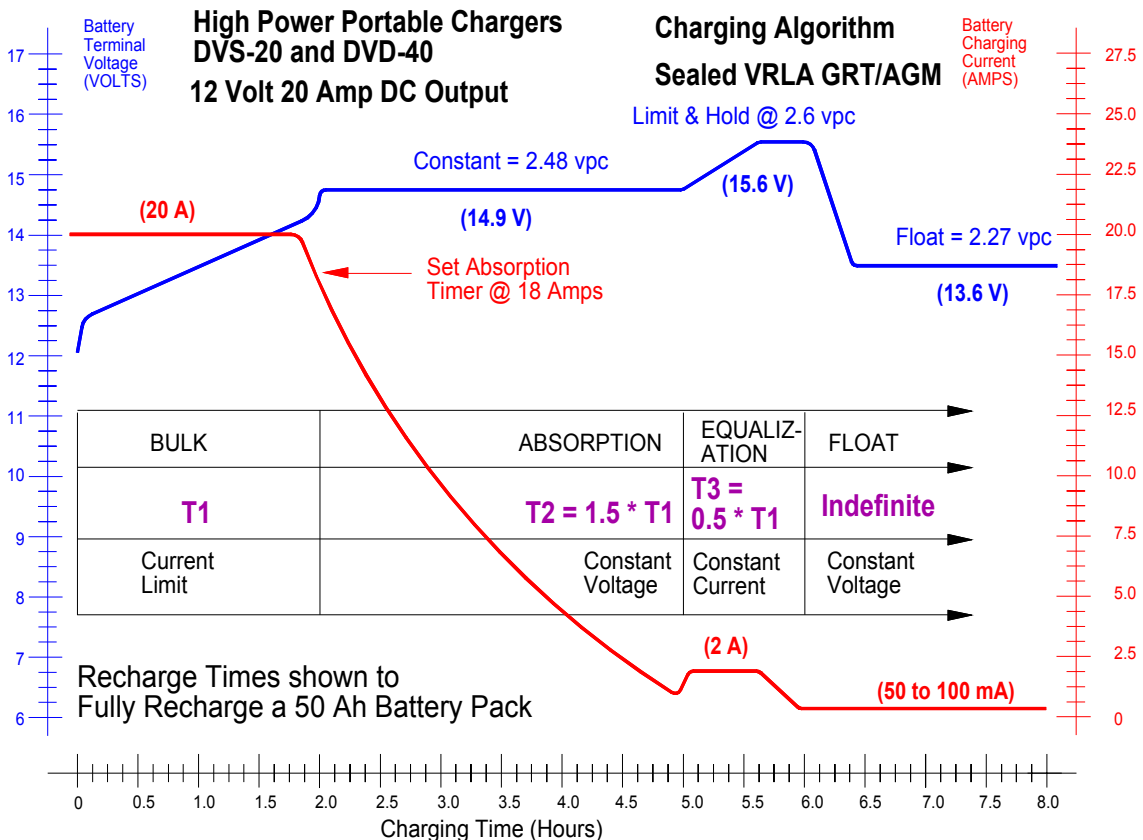


Figure 3 Chg Graph: DV High Pwr Portables: 12V20A GRT/AGM