

TWINCA

DUMPER



Brugermanual
E-500/E-500 Slim F2A

Indholdsfortegnelse

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Twinca A/S forbeholder sig rettigheden til ændring af maskinspecifikationen uden forpligtende foregående underrettelse.

1 Maskinens anvendelse

Twinca Dumper er beregnet til transport af primært jord, granulater, sten, beton samt organiske materialer.

Twinca Dumper har et unikt ergonomisk styretøj. Twinca Dumper er nem at styre således at hård fysisk belastning ved kørsel af tung last minimeres.

Med Twinca Dumper bliver arbejdsgangene på arbejdspladsen nemmere. Twinca Dumper kan komme rundt over alt, og det er ikke nødvendigt at bruge køreplader, selvom terrænet er ujævnt.

Twinca Dumper er især velegnet til anlægsgartnere, entreprenører, landmænd, kirkegårdsgravere, kommunale driftsafdelinger og renoverings- og udlejningsfirmaer.



Brugervejledning

Læs brugervejledningen grundigt igennem og lad også alle eventuelle brugere gennemlæse brugervejledningen, før maskinen tages i brug.

For en korrekt anvendelse og vedligeholdelse af maskinen, skal brugeren have læst og forstået brugervejledningen.

Ud over henvisningerne i denne brugsanvisning skal lovens generelle sikkerheds- og ulykkesforebyggelsesforskrifter overholdes.

Maskinens operatør/bruger er ansvarligt for ulykker mod andre personer eller deres ejendom.

2 Miljøbeskyttelse



For beskyttelse af miljøet er det vigtigt, at kasserede maskindele og tilbehør bliver afleveret til relevante genbrugspladser, idet maskinen indeholder omsættelige materialer.

Maskindele	Materiale
Styr	Stål
Chassis	Stål
Batteri 500383	2 x 12 V / 80 Ah
Hydraulisk tandhjulspumpe	Aluminium og stål
Variabelhydraulikpumpe	Stål og Messing
Lad	Stål
Øvrige dele	Stål og aluminium

Da maskinen har et støjniveau på mindre end 70 dB(A), foretages ikke lyd måling.

3 Technical data

E-500	Data
Width (mm)	797
Length (mm)	1717
Height (dump bed)/(control lever) (mm)	950/1170
Lifting height (mm)	515/1921
Driving conditions	
Terrain	400 kg
Solid ground	500 kg
Maximum speed - forwards (km/h)	6
Maximum speed - backwards (km/h)	6
Bed capacity - loading volume (l)	250
Bed capacity - maximum volume (kg)	Up to 500
Machine weight (kg)	266
Noise level (dB(A))	<70
IP Code	IP 44
Battery	2 x 12 V / 80 Ah
Hydraulic oil	832 WRHV

E-500 Slim	Data
Width (mm)	742
Length (mm)	1717
Height (dump bed)/(control lever) (mm)	955/1164
Lifting height (mm)	520/1926
Driving conditions	
Terrain	400 kg
Solid ground	500 kg
Maximum speed - forwards (km/h)	6
Maximum speed - backwards (km/h)	6
Bed capacity - loading volume (l)	250
Bed capacity - maximum volume (kg)	Up to 500
Machine weight (kg)	264
Noise level (dB(A))	<70
IP Code	IP 44
Battery	2 x 12 V / 80 Ah
Hydraulic oil	832 WRHV

4 Personlig sikkerhed

For din egen personlige sikkerhed, og sikkerheden for dine omgivelser, er det vigtigt at brugermanualen er læst og forstået. Det er brugerens ansvar, at man fuldstændig har forstået betjeningsvejledningen til brug for korrekt og sikker kørsel med maskinen. Hvis du er usikker på korrekt håndtering og brug af Twinca Dumper, er det vigtigt at du kontakter sælger eller Twinca A/S.



Advarsel

Fejlagtig vedligeholdelse kan være risikabelt. Læs og forstår dette afsnit før du udfører nogen form for vedligeholdelse, service eller reparation på maskinen

- Denne maskine er meget tung og bør ikke løftes alene. **Søg Hjælp** og brug et egnet løfteredskab.
- Hold arbejdsområdet frit, og sørg for at personer uden tilhørsforhold til arbejds- processen er på sikker afstand af maskinen og arbejdsområdet.
- Personlige værnemidler skal bæres af brugeren, når dette er påkrævet.
- Vær sikker på at du ved, hvordan du slukker maskinen før du tænder den, i tilfælde af at du kommer i vanskeligheder under brugen af maskinen.
- Sluk altid for maskinen, når den skal transporteres, serviceres eller repareres.
- Du må aldrig ændre eller fjerne monterede sikkerhedsforanstaltninger, de er påsat for at varetage din personlige sikkerhed. Det er vigtigt at du kontrollerer at sikkerhedsforanstaltningernes tilstand er i orden. Såfremt de er i stykker eller mangler – **MÅ BRUGEN AF TWINCA DUMPER IKKE FINDE STED** før sikkerhedsforanstaltningerne er genetableret eller repareret.
- Du må ikke betjene maskinen hvis du er syg, føler dig træt eller er påvirket af alkohol eller stoffer.
- Det er ikke tilladt at stå på maskinen på noget tidspunkt.
- Det er ikke tilladt at benytte Twinca Dumper til transport af mennesker.
- Ved kørsel ned ad bakke skal Minidumperen ALTID være foran operatøren
- Gå kontrolleret rundt om maskinen, da ladet har skarpe hjørner.
- Ladet skal altid være nede når maskinen forlades!

Personlige værnemidler

Ved kørsel af maskinen skal der benyttes passende personlige værnemidler, såsom sikkerhedsbriller, sikkerhedshandsker, ørepropper, støvmaske og sikkerhedsfodtøj. Iklæd dig de personlige værnemidler, som er påkrævet til det arbejde du udfører. Sørg for at langt hår er bundet op, og alle smykker er taget af, idet de kan hænge fast i maskinens bevægelige dele.

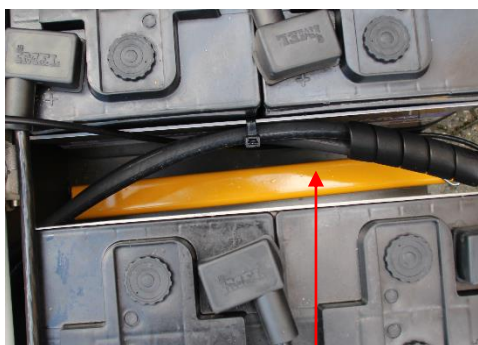
4 Personlig sikkerhed

Monter altid sikringsbeslaget til cylinderen for tip-ladet, før der arbejdes med motor, hydraulik og andet service på maskinen.

Placering af sikringsbeslag når de ikke er i brug. (fig.1, pos.1)

Placering af sikringsbeslag når de er i brug. (fig.2, pos.1)

FIG.1



POS.1

FIG. 2



POS.1

Parkeringsbremser

Parkeringsbremsen løsnes automatisk, ved kørsel af maskinen, samt aktiveres automatisk når maskinen standser fig.3.

Mini dumperen skal parkeres på et plan og fast underlag med ladet nede.

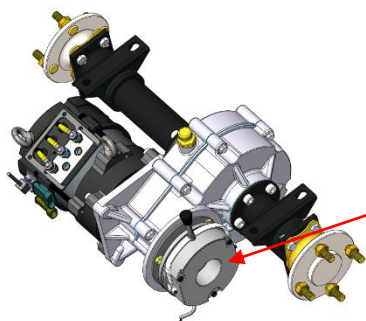
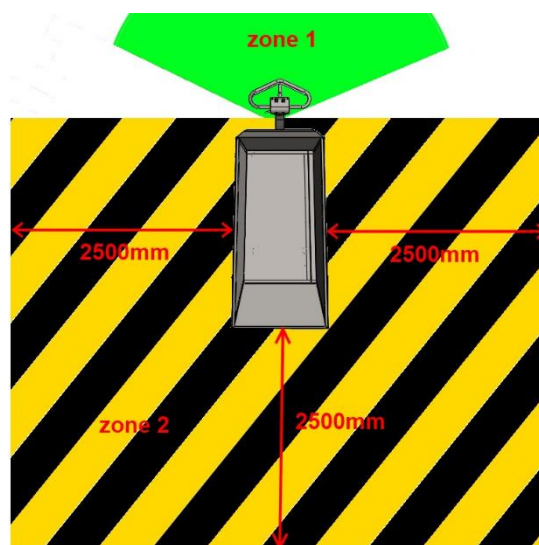


FIG.3



Brugeren må kun befinde sig i zone 1.

På grund af klemningsfare skal brugeren sikre sig, at der ikke er personer i zone 2 under drift.



5 Nødstop

Nødstoppen bryder den elektriske kreds.



6 Friløb

Ved at trække ud i låsen (pos.1) fri gøres den mekanisk bremse på akslen. Maskinen skal være strøm løs.



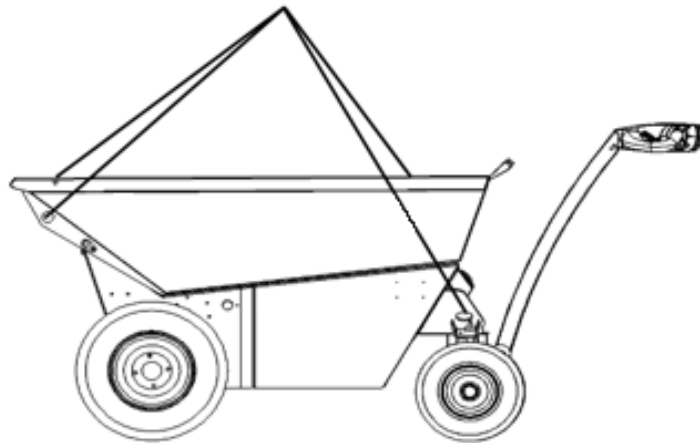
POS.1



7 Transport af maskinen

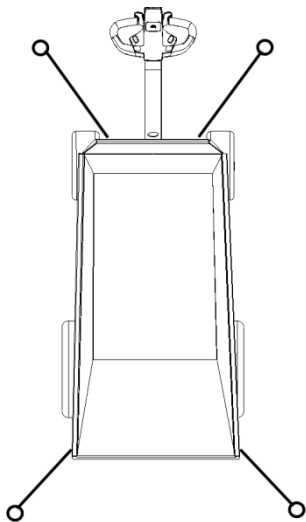
Løft og transport af maskinen.

Når maskinen skal løftes, skal man altid montere wire eller kæder i alle fire anhugningspunkter. Dermed sikrer man det meste stabile løft.



Surring af maskinen.

Maskinen fastgøres i hvert af de fire anhugningspunkter under transport.



8 Kørsel

Føren skal altid værer bag ved maskinen , det vil sige at føren skal altid være på det højest punkt



9 Ved punktering

Ved punktering bring maskinen hurtigst til standsning



10 Check før start



Inspektion før start.

I den følgende inspektion før start, er det beskrevet hvad der skal kontrolleres før start samt efter konstant brug i fire timer. Der henvises til service afsnittet for detaljeret vejledning. Hvis der viser sig at være en fejl, må Twinca Dumper ikke benyttes før at fejlen er rettet.

- Kontroller Twinca Dumper grundigt for tegn på fejl og mangler.
- Kontroller at alle dele er til stede og fungerer optimalt.
- Kontroller hydraulikoliens niveau – og fyld op hvis det påkræves.
- Kontroller syre niveau på batterierne. Væsken skal dække alle cellerne. På hvert batteri er der 3 skruelåg, hvor syrestanden kan kontrolleres. (fig.1, pos.1)
- Kontroller dæktryk.



FIG.1

POS.1

Daglig opladning.

Tilslut 230V

Maskinen er inaktiv så længe batteri-laderne er aktiv.

Opladning af maskinen sker ved at forbinde et strømkabel til kontakten på maskinen



Undgå elektriske stød samt eksplosioner.

Behandling af strøm skal omgås med stor respekt. Udfør altid arbejdet i et ventileret område. Vær sikker på at du ved hvor brandslukningsudstyret er placeret, og hvordan det bruges.

- Brug aldrig en våd, defekt eller slidt forsyningskabel
- Vær sikker på alt elektrisk udstyr er korrekt tilsluttet.
- Under opladning skal maskinen stå i en ventileret rum.
- Ved elektrisk brand, anvendes et skumslukker.

11 Kørsel med maskinen

Maskinen er fuld elektrisk dreven. Når man deaktiverer vip-håndtaget sætter maskinen hastigheden ned til fuld stop i løbet af 3 sekunder.

For at køre frem løftes vip-håndtaget op (fig.1 pos. 2) (frem).

For at bakke med maskinen trykkes vip-håndtaget ned (fig.1 pos. 2) (tilbage).

BEMÆRK! Parkeringsbremsen løsnes automatisk ved kørsel af maskinen.

Aktivering af ladet.

Afbryderen (fig.1 pos. 3) er til styring af hydraulikcylinderen.

Tryk på den øverste del af afbryderen, kører hydraulikcylinderen op.

Tryk på den nederste del af afbryderen, kører hydraulikcylinderen ned.

Belly funktionen.

Når belly funktionen (fig.1 pos. 1) aktiveres, ændres maskinens kørsel til fremad, væk fra føreren og standser derefter.

Display. (fig.2 pos 1)

Visning af driftstimer og strøm niveau på batterierne.

Hvis der er fejl på maskinen, vises en alarm kode.

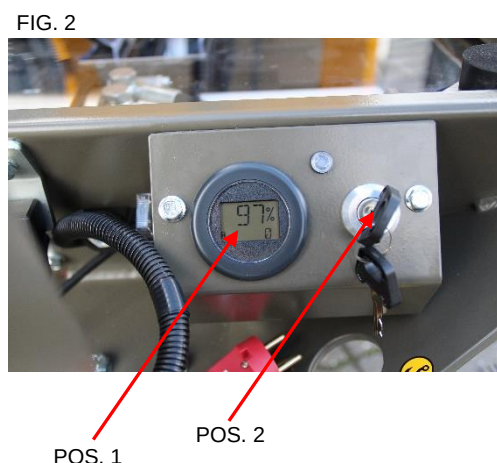
Nøgle. (fig.2 pos 2)

Når nøglen drejes, aktiveres maskinens controller. Driftstimer starter med at tælle op.

Aktivering af Sakselift (fig. 1 pos. 3)

Tryk på den øverste del af afbryderen, kører saksen op.

Tryk på den nederste del af afbryderen, kører saksen ned.



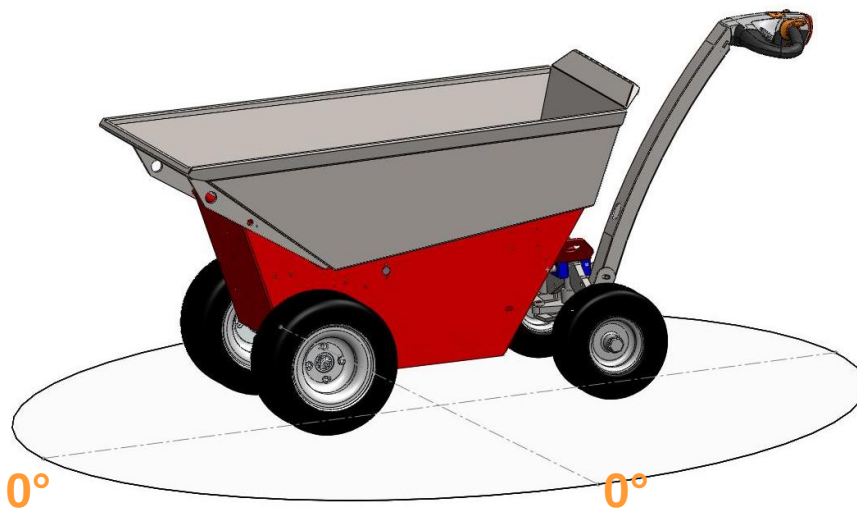
11 Kørsel med maskinen



Advarsel Kørsel af maskinen, operatøren skal altid være på det højeste punkt

Tømning af ladet

- Stands maskinen før der startes med at tippe ladet.
- Læn dig aldrig ind over maskinen når ladet tippes.
- Vær sikker på at indholdet let kan slippe ladet når ladet tippes.
- Man må aldrig tippe ladet når maskinen holder ned ad med fronten (som minimum skal planen være vandret)
- Gå aldrig foran maskinen for at løsne fastsiddende materialer i ladet
- Fjern kun det fastsiddende materiale, når ladet er nede.



Ovenstående billede illustrerer, at underlaget under maskinen skal være i nul grader (0°) når man tipper med ladet.

SIKRE AT DER ALDRIG ER PERSONER VED SIDEN AF ELLER FORAN MASKINEN PÅ NOGEN TIDSPUNKT.

12 Fejlfindingsguide

Problem	Art	Løsning
Nedsat ydeevne på Batteriet.	Mangler syre	Bør udskiftes
	Batteriet er slidt	
Ladet bevæger ikke normalt.	Mangel på hydraulikolie	Fyld hydraulikolie på. Type: Hydraulikolie 832 WRHV

13 Service og vedligeholdelse

Før service. Placer altid de gule sikringsbeslag på hydraulikcylinder. (fig 2 pos 1)
Og afbryd strømmen til maskinen. (fig 1 pos 1)

Bemærk - Selvom hovedafbryderen er afbrudt. Er der stadig meget stort energi i batterierne!

Hydraulikolie

Hydraulikolien skal udskiftes én gang årligt. Hvis der skulle være noget tegn på lækage, stop maskinen og kontakt din lokale forhandler eller Twinca A/S.
Type: Hydraulikolie 832 WRHV

Rengøring af maskinen

Til rengøring bruges en børste og vand.

Bemærk Rengør aldrig el-motoren med højtryksrenser eller med en vandslange. Rengøring af motoren må kun foregå med en klud eller lufttryk.

FIG. 1



FIG. 2



13 Service og vedligeholdelse

Rutine vedligeholdelse		Dagligt	Hver 20 timer	Hver 50 timer
Smøre punkter på hydraulikcylinderen	udføres		●	
Smøre punkter til Vip punkt til ladet	udføres		●	
Smøre punkter på styretøjet	udføres		●	
Styrekugler efterspændes	udføres		●	
Kontroller syre på batterierne	udføres			●
Hydraulikolie	Skift			1. årligt
Kontroller dæktryk	udføres	●		
Sikkerheds-eftersyn	Udføres af kompetent person			1. årligt
Gear Olie	Skift			1. årligt

Batteri.

Maskinen indeholder 2 x 12 V / 80 Ah batterier.

som indeholder bly og syre.

Med et samlet spændingsniveau på 24 V.

Under opladning skal maskinen stå i en ventileret rum.

Batteriet har en cyklus mellem 800-1000 opladninger.

Hvis batteriet aflader hurtigere end normalt. Betyder dette, at batteriet bør udskiftes.

Alle batterierne skal udskiftes samtidig.

Afmonter altid batteriet før der påbegyndes arbejde på det elektriske system. Afmonter altid den negative pol først. Ved genmontering af batteriet skal den negative pol tilsluttes sidst.

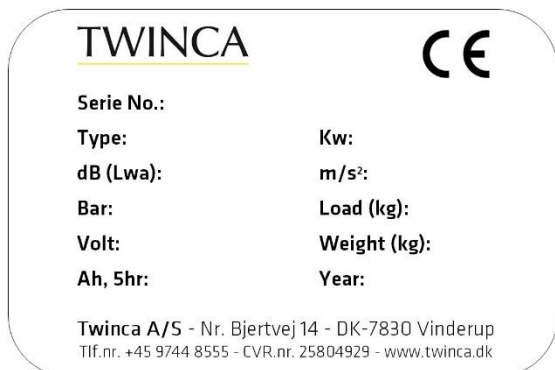
Ved elektrisk brand, anvendes et skumslukker.

Lade instruktioner:

Lade voltage niveau ved 77°F / 25°C	
System voltage	24V
Daglig opladning	29,6V

14 Piktogrammer

Maskinskilt



Advarselsskilte:

Klemningsfare

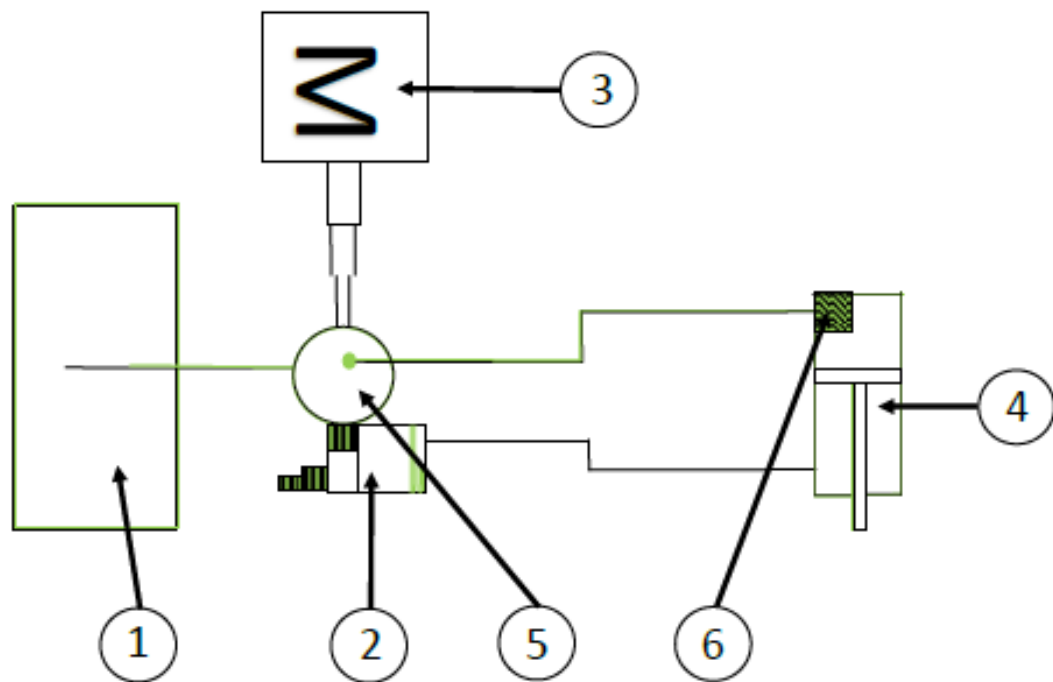


Info skilte:

Surringspunkt

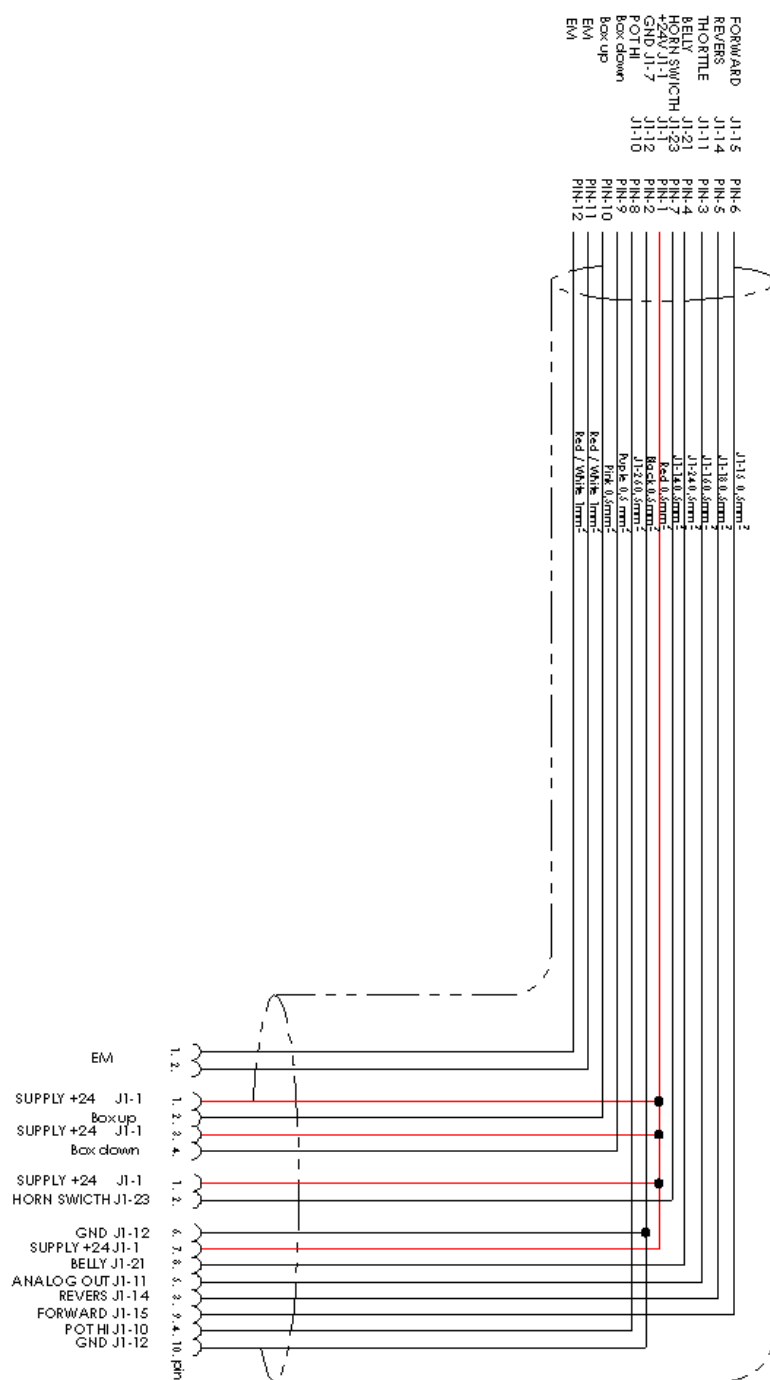


15 Hydraulikdiagram

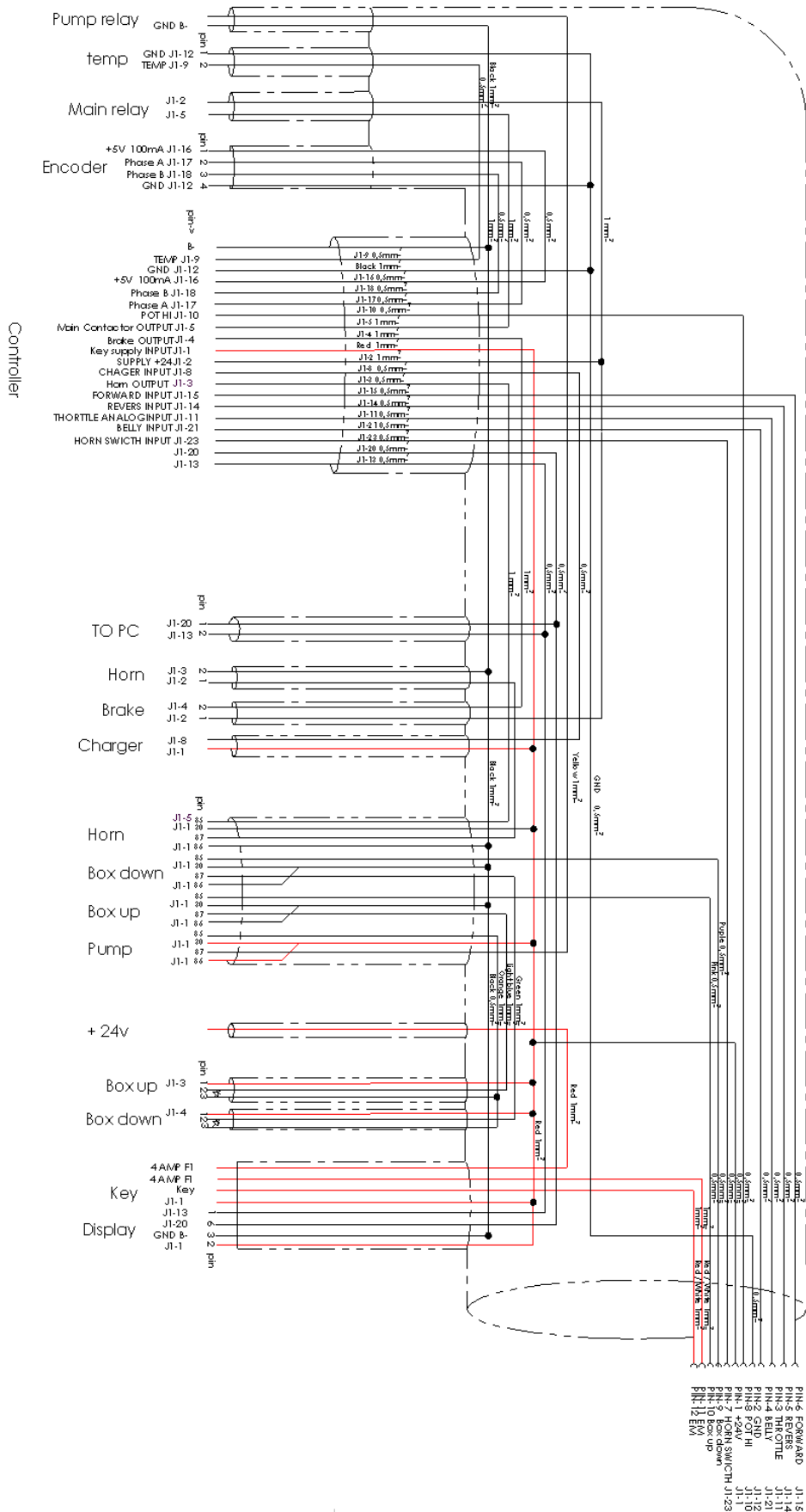


1. Oiletank
2. Ventil
3. El-motor
4. Hydraulikcylinder
5. Hydraulikpumpe
6. Slangebrudsventil

16 El-diagram



16 El-diagram



17 Garantibetingelser

Din nye Twinca Dumper er dækket af garanti i henhold til sælgergarantien for en periode af 1 år (12 måneder) fra aftalens indgåelse. Garantien fra Twinca A/S omfatter fejl i konstruktion, materialer eller monteringsfejl.

De følgende punkter er *ikke* indeholdt under garantien fra Twinca A/S

- Skader som er forårsaget af manglende vedligeholdelse, ukorrekt brug, eller som et resultat af at vedligeholdelsesvejledningen ikke er fuldt efter forskrifterne.
- Forandringer, tilføjelser eller reparationer som er udført af andre end Twinca A/S eller dennes anerkendte forhandlere.
- Skade forårsaget ved transport eller forsendelse til og fra Twinca A/S eller dennes anerkendte forhandlere i tilfælde af reparation eller vurdering af skadeskrav inden for garantien.
- Tab af arbejdsfortjeneste og følgeskader.
- Kørsel, bro, vejafgift og andre transport og person udgifter.

Følgende dele er ikke dækket af garanti.

- Hydraulikslanger
- Nøgletænding

Twinca A/S og / eller deres anerkendte agenter, direktører, ansatte eller forsikringsselskaber vil ikke blive holdt ansvarlig for følgeskader eller andre skader, tab eller udgifter i forbindelse med eller på grund af eller manglende evne til at bruge maskinen til ethvert formål.

Skadesanmeldelse

Alle garantikrav vil først blive dirigeret til Twinca A/S, enten via telefon, fax, e-mail eller skriftligt.

Kontakt ved skadesanmeldelse:

Tel: +45 9744 8555 #5 E-mail: RMA@twinca.dk

Kontakt:

Twinca A/S
Nr.Bjertvej 14
DK-7830 Vinderup

18 A-erklæring:

EF-overensstemmelseserklæring bilag II

Fabrikant:

Firmanavn : Twinca A/S
Adresse : Nr.Bjertvej 14
Postnr./by : 7830 Vinderup
Land : Danmark
Telefon : +45 9744 8555
CVR.nr. : 2580 4929

Ansvarlig for teknisk dossier:

Direktør: : Klaus Strøm Kristensen

Erklærer hermed, at

Maskine:

Mærke : Twinca Dumper
Serienummer : _____
Type : Mini dumper E-500/E-500 slim
Er udført i henhold til: Maskindirektivet 2006/42/EF

Titel : Direktør
Navn : Klaus S. Kristensen
Firma : Twinca A/S

Vinderup den 1. januar 2020



Klaus Strøm Kristensen

TROUBLESHOOTING CHART INDEX

Flash Code		Fault Name	CAN Index	Page
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1-5	0x15	Controller Severe Undertemperature	0x2141	
1-6	0x16	Controller Severe Overtemperature	0x2142	
1-7	0x17	Severe B+ Undervoltage	0x2120	
1-7	0x17	Severe KSI Undervoltage	0x2122	
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1-8	0x18	Severe KSI Overvoltage	0x2132	
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2-6	0x26	Ext 12V Supply Failure	0x2532	
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3-5	0x35	Proportional Driver	0x2440	
3-6	0x36	Encoder Fault	0x2230	
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Flash Code		Fault Name	CAN Index	Page
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5-3	0x53	User 3 Fault	0x2712	
5-4	0x54	User 4 Fault	0x2713	
5-5	0x55	User 5 Fault	0x2720	
5-6	0x56	User 6 Fault	0x2721	
5-7	0x57	User 7 Fault	0x2722	
5-8	0x58	User 8 Fault	0x2723	
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9-9	0x99	Parameter Mismatch	0x2812	
9-10	0x9A	Interlock Braking Supervision	0x2332	143
9-11	0x9B	EMR Supervision	0x2333	
10-1	0xA1	Driver 1 Fault	0x2160	
10-2	0xA2	Driver 2 Fault	0x2161	
10-3	0xA3	Driver 3 Fault	0x2162	
10-4	0xA4	Driver 4 Fault	0x2163	144
10-5	0xA5	Driver 5 Fault	0x2164	
10-8	0xA8	Driver Assignment	0x2632	
11-1	0xB1	Analog 1 Out Of Range	0x2620	
11-2	0xB2	Analog 2 Out Of Range	0x2621	
11-3	0xB3	Analog 3 Out Of Range	0x2622	
11-4	0xB4	Analog 4 Out Of Range	0x2623	
B-5	0xB5	Analog 5 Out Of Range	0x2624	145
11-6	0xB6	Analog 6 Out Of Range	0x2625	
11-7	0xB7	Analog 7 Out Of Range	0x2626	
11-8	0xB8	Analog 8 Out Of Range	0x2627	
11-11	0xBB	Analog 14 Out Of Range	0x262A	
11-12	0xBC	Analog Assignment	0x2631	
12-1	0xC1	Branding Error	0x2860	

Table 16 AC F2-A Controller Troubleshooting Chart

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
1-2 0x12	Controller Overcurrent <i>Controller_Overcurrent_Active</i> 0x2510 Fault Type(s): 1 = Controller Over Current Phase U 2 = Controller Over Current Phase W 3 = Controller Over Current Phase V 4 = Irms > 135 % Current Limit	1. External short of phase U, V, or W motor connections. 2. Speed encoder noise problems. 3. Motor parameters are mistuned. 4. Controller defective.	<i>Set:</i> Phase current exceeded the current measurement limit. <i>Clear:</i> Reset Controller	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-3 0x13	Current Sensor <i>Current_Sensor_Active</i> 0x2832 Fault Type(s): 1	1. Leakage to vehicle frame from phase U, V, or W (short in motor stator). 2. Controller defective.	<i>Set:</i> Controller current sensors have invalid offset reading. <i>Clear:</i> Reset Controller	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-4 0x14	Precharge Failed <i>Precharge_Failed_Active</i> 0x2223 Fault Type(s): 1 Abort 2 Energy Limit Exceeded 3 Time Limit Exceeded	1. An external load on the capacitor bank (B+ connection terminal) that prevents the capacitor bank from charging. 2. See Programmer » System Monitor menu » Controller » Capacitor Voltage.	<i>Set:</i> The precharge failed to charge the capacitor bank. <i>Clear:</i> Cycle Interlock or Reset Controller	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-5 0x15	Controller Severe Undertemp <i>Controller_Severe_Undertemp_Active</i> 0x2141 Fault Type(s): 1	1. Controller is operating in an extreme environment. 2. See Programmer » System Monitor menu » Controller » Controller Temperature.	<i>Set:</i> Heatsink temperature below –40 °C. <i>Clear:</i> Bring heatsink temperature above –40 °C. and then Reset Controller	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-6 0x16	Controller Severe Overtemp <i>Controller_Severe_Overtemp_Active</i> 0x2142 Fault Type(s): 1	1. Controller is operating in an extreme environment. 2. Excessive load on vehicle. 3. Improper mounting of controller. 4. See Programmer » System Monitor menu » Controller » Controller Temperature.	<i>Set:</i> Heatsink temperature above +95 °C. <i>Clear:</i> Bring heatsink temperature below +95 °C, and then Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-7 0x17	Severe B+ Undervoltage <i>Severe_B_Plus_Undervoltage_Active</i> 0x2120 Fault Type(s): 1	1. Non-controller system drain on battery. 2. Battery resistance too high. 3. Battery disconnected while driving. 4. Blown B+ fuse or main contactor did not close. 5. Battery parameters are misadjusted. 6. See Programmer » Monitor menu » Controller » Capacitor Voltage.	<i>Set:</i> When Main is closed and FET Bridge enabled: Either the undervoltage drive current cut back = 0 % for 64 ms or the Brownout Voltage is reached. <i>Clear:</i> Undervoltage drive current cut back > 0 % for 100 ms and capacitor voltage > brownout voltage.	No drive torque
1-7 0x17	Severe KSI Undervoltage <i>Severe_KSI_Undervoltage_Active</i> 0x2122 Fault Type(s): 1	1. Non-controller system drain on battery/keyswitch circuit wiring. 2. Resistance in low power (KSI) circuit is too high. 3. KSI disconnected while driving. 4. Blown fuse. 5. See Programmer » System Monitor menu » Battery » Keyswitch Voltage.	<i>Set:</i> When below Brownout Voltage for 2 seconds. <i>Clear:</i> Bring KSI voltage above Brownout Voltage.	None, unless a fault action is programmed in VCL.

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
1-8 0x18	Severe B+ Overvoltage <i>Severe_B_Plus_Overvoltage_Active</i> 0x2130 Fault Type(s): 1	1. Battery parameters are misadjusted. 2. Battery resistance too high for given regen current. 3. Battery disconnected while regen braking. 4. See Programmer » System Monitor menu » Controller » Capacitor Voltage.	<i>Set:</i> Capacitor bank voltage exceeded the Severe Overvoltage limit with FET bridge enabled. <i>Clear:</i> Bring capacitor voltage below Severe Overvoltage limit, and then <i>Reset Controller</i>.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-8 0x18	Severe KSI Overvoltage <i>Severe_KSI_Overvoltage_Active</i> 0x2132 Fault Type(s): 1	1. Battery-voltage applied to KSI (pin 1) exceeds the Severe Overvoltage limit. 2. See Programmer » Monitor menu » Battery » Keyswitch Voltage.	<i>Set:</i> KSI voltage exceeded the Severe Overvoltage limit. <i>Clear:</i> Bring KSI voltage below the Severe Overvoltage limit, and then <i>Reset Controller</i>.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
1-9 0x19	Speed Limit Supervision <i>Speed_Limit_Supervision_Active</i> 0x2133 Fault Type(s): 1	1. Motor speed detected exceeding the limit set by the Max Speed Supervision parameter. 2. Misadjusted Max Speed Supervision parameters. 3. See: Programmer » Application Setup » Max Speed Supervision menu.	<i>Set:</i> Motor rpm has exceeded the Max Speed Limit setting for the Max Speed Time Limit setting's duration. <i>Clear:</i> <i>Reset Controller</i>.	<i>ShutdownInterlock</i> <i>ShutdownEMBrake</i>
1-10 0x1A	Travel Control Supervision <i>Travel_Control_Supervision_Active</i> 0x2134 Fault Type(s): 1	1. With the vehicle in the stopped state, the motor frequency and/or phase current detected exceeding the limit set by the Travel Control Supervision parameter. 2. Misadjusted Travel Control Supervision parameters. 3. See: Programmer » Application Setup » Travel Control Supervision menu.	<i>Set:</i> The motor frequency and/or and phase-current are above their Travel Control Supervision settings when in the stopped state. <i>Clear:</i> <i>Reset Controller</i>.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
2-2 0x22	Controller Overtemp Cutback <i>Controller_Overtemp_Cutback_Active</i> 0x2140 Fault Type(s): 1	1. Controller is operating in an extreme environment. 2. Excessive load on vehicle. 3. Improper mounting of controller which is preventing controller cooling. 4. Controller is performance-limited at this temperature. 5. See Programmer » System Monitor menu » Controller: Temperature.	<i>Set:</i> Controller's Heatsink temperature exceeded 85 °C. <i>Clear:</i> Bring heatsink temperature below 85 °C.	Reduced drive torque. Reduced regen braking torque.
2-3 0x23	Undervoltage Cutback <i>Undervoltage_Cutback_Active</i> 0x2121 Fault Type(s): 1	1. Batteries need recharging. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Non-controller system-drain on battery. 4. Battery resistance too high. 5. Battery disconnected while driving. 6. Blown B+ fuse or main contactor did not close. 7. See Programmer » System Monitor menu » Controller » Currents » UnderVoltageCutback. 8. See Programmer » System Monitor menu » Controller » Capacitor Voltage.	<i>Set:</i> Capacitor bank voltage dropped below the UnderVoltageCutback limit with the FET bridge enabled. <i>Clear:</i> Bring the capacitor voltage above the controller's UnderVoltageCutback limit.	Reduced drive torque.

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
2-4 0x24	Overvoltage Cutback <i>Overvoltage_Cutback_Active</i> 0x2131 Fault Type(s): 1	1. Normal operation. Fault shows that regen braking currents elevated the battery voltage during regen braking. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Battery resistance too high for given regen current. 4. Battery disconnected while regen braking. 5. See Programmer » System Monitor menu » Controller » Currents » OverVoltageCutback. 6. See Programmer » System Monitor menu » Controller » Capacitor Voltage.	<i>Set:</i> The controller's capacitor bank voltage exceeded the OverVoltageCutback limit with the FET bridge enabled. <i>Clear:</i> Bring controller's capacitor voltage below the OverVoltageCutback limit.	Reduced brake torque. Note: This fault is declared only when the controller is running in regen.
2-5 0x25	Ext 5V Supply Failure <i>Ext_5V_Supply_Failure_Active</i> 0x2531 Fault Type(s): 1 = 5 V Supply's voltage is out-of-range 2 = 5 V Supply's current is out-of-range	1. External load impedance on the +5 V supply (pin 16) is too low. 2. See Programmer » System Monitor menu » Outputs: Ext_5V_Supply, Ext_5V_Current.	<i>Set:</i> (1) The 5 V Supply (pin 16) is outside $5\text{ V} \pm 10\%$ (2) The current is outside limits defined by: Ext_5V_Supply_Min Ext_5V_Supply_Max <i>Clear:</i> Reset Controller, or Re-set using VCL variable Ext_5V_Output_Enable	Disables the 5 V Supply
2-6 0x26	Ext 12V Supply Failure <i>Ext_12V_Supply_Failure_Active</i> 0x2532 Fault Type(s): 1 = 12 V Supply's voltage is out-of-range 2 = 12 V Supply's current is out-of-range	1. External load impedance on the +12 V supply (pin 23) is too low. 2. See Programmer » System Monitor menu » Outputs: Ext_12V_Supply, Ext_12V_Current.	<i>Set:</i> (1) The 12 V supply (pin 23) is outside $12\text{ V} \pm 15\%$ (2) The current is outside the limits defined by: Ext_12V_Supply_Min Ext_12V_Supply_Max <i>Clear:</i> Reset Controller. Or Re-set using VCL variable Ext_12V_Output_Enable.	Disables the 12 V Supply None, unless a fault action is programmed in VCL.
2-8 0x28	Motor Temp Hot Cutback <i>Motor_Temp_Hot_Cutback_Active</i> 0x2151 Fault Type(s): 1	1. Motor temperature is at or above the programmed Temperature Hot setting—resulting in a reduction of controller drive current. 2. The motor temperature and sensor control parameters are misadjusted. 3. See Programmer » AC Motor Setup » Temperature Sensor.	<i>Set:</i> Motor temperature is at or above the Temperature Hot parameter setting. <i>Clear:</i> Bring the motor temperature within range.	Reduced Drive Torque If MotorBrakingThermalCutBack_Enable = On, then Regen Braking Torque is reduced.
2-9 0x29	Motor Temp Sensor <i>Motor_Temp_Sensor_Active</i> 0x2150 Fault Type(s): 1	1. Motor thermistor is not connected properly. 2. sensor polarity (between Pin 9 and Pin 12) is incorrect. 3. The motor temperature and sensor parameters are misadjusted. 4. See Programmer » System Monitor menu » AC Motor » Temperature.	<i>Set:</i> Motor thermistor input (pin 9) is at the voltage rail. <i>Clear:</i> Bring the motor thermistor input voltage within range.	MaxSpeed reduced (LOS, Limited Operating Strategy), and motor temperature cutback disabled.

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
3-1 0x31	MAIN DRIVER <i>Main_Driver_Fault_Active</i> 0x2222 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Open Wire (at pin)	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring.	<i>Set:</i> Main Contactor driver is either open or shorted. This fault can be set only when Main Enable = On. <i>Clear:</i> Restore/repair any external wiring or device-coil to their correct state, then <i>Reset Controller</i> .	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
3-2 0x32	EM Brake Driver <i>EM_Brake_Driver_fault_Active</i> 0x2320 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Open Wire (at pin)	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring.	<i>Set:</i> Electromagnetic brake driver (pin 4) is either open or shorted. This fault can be set only when EM Brake Type >0. <i>Clear:</i> Restore/repair any external wiring or device-coil to their correct state, then <i>Reset Controller</i> .	<i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
3-5 0x35	Proportional Driver <i>Proportional_Driver_Fault_Active</i> 0x2440	See Driver 1 Fault (page 143)		
3-6 0x36	Encoder Fault <i>Encoder_Fault_Active</i> 0x2230 Fault Type(s): 1 = Loss of regulation 2 = Over Current trips Loss of pulses 3 = Loss of speed signal pulses 4 = Autocharacterization 5 = Encoder supply (voltage) fault	1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See Programmer » System Monitor menu » AC Motor: Motor RPM. 4. See Programmer » AC Motor Setup » Quadrature Encoder » Encoder fault Setup.	<i>Set:</i> Motor encoder phase failure detected. <i>Clear:</i> Either <i>Reset Controller</i> , or if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Encoder Fault is cleared and Encoder LOS fault (flash code 9-3) is set, allowing limited motor control.	<i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownMotor</i>
3-7 0x37	Motor Open <i>Motor_Open_Active</i> 0x2240 Fault Type(s): 1	1. Motor phase is open. 2. Bad crimps or faulty wiring.	<i>Set:</i> Motor phase U, V, or W detected open. <i>Clear:</i> Cycle KSI.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
3-8 0x38	Main Contactor Welded <i>Main_Contactor_Welded_Active</i> 0x2220 Fault Type(s): 1	1. Main contactor tips are welded closed. 2. Motor phase U or V is disconnected or open. 3. An alternate voltage path (such as an external circuit to B+) is providing a current to the capacitor bank (B+ connection terminal).	<i>Set:</i> Just prior to the main contactor closing, the capacitor bank voltage (B+ connection terminal) was loaded (via the motor) for a short time and the voltage did not discharge indicating a direct-contact to the battery (i.e., Main tips are welded closed). <i>Clear:</i> <i>Reset Controller</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
3-9 0x39	Main Contactor Did Not Close <i>Main_Contactor_Did_Not_Close_Active</i> 0x2221 Fault Type(s): 1 = Main did not close when commanded 2 = Main disconnected during operation	Type1: 1. Main contactor did not close. 2. Main contactor tips are oxidized, burned, or not making good contact. 3. An external load on the capacitor bank (B+ connection terminal) is preventing the capacitor bank from charging. 4. Blown B+ fuse. 5. Main Contactor parameters mistuned Main Pull In Voltage, Main Holding Voltage. Type2: 1. Main opened during operation (while commanded closed). 2. Driver wiring to contactor's coil (e.g., pin 3 wiring) removed during operation. 3. Contactor/coil defective.	<i>Set:</i> With the main contactor commanded closed, the capacitor bank voltage (B+ connection terminal) did not charge to B+. <i>Clear:</i> Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
4-2 0x42	Throttle Input <i>Throttle_Input_Active</i> 0x2210 Fault Type(s): 4 1 = Outside the Low or High parameter.	1. Throttle voltage exceeded the Analog Low or Analog High parameters for the analog input defined for the throttle input. 2. See Programmer » Controller Setup » Analog Inputs » Analog 1 Type. 3. See Programmer » Controller Setup » Analog Inputs » Configure.	<i>Set:</i> Throttle voltage exceeded the <i>Analog Low</i> or <i>Analog High</i> parameters for the analog input defined for the throttle input. <i>Clear:</i> Bring throttle input voltage within the Min and max thresholds. <i>Reset Controller.</i>	ShutdownThrottle
4-6 0x46	NV Memory Failure <i>NV_Memory_Failure_Active</i> 0x2830 Fault Type(s): 1 = Invalid checksum. 2 = NV write failed. 3 = NV read failed. 4 = NV write did not complete during power down.	1. Failure to read or write to nonvolatile (NV) memory. 2. Internal controller fault.	<i>Set:</i> Controller operating system tried to read or write to EEPROM memory and failed. <i>Clear:</i> Download the correct software and matching parameter default settings into the controller and <i>Reset Controller.</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownInterlock</i> <i>ShutdownDriver1</i> <i>ShutdownDriver2</i> <i>ShutdownDriver3</i> <i>ShutdownDriver4</i> <i>ShutdownDriver5</i> <i>ShutdownPD</i> <i>FullBrake</i>
4-7 0x47	HPD Sequencing <i>Hpd_Sequencing_Active</i> 0x2211 Fault Type(s): 1	1. Incorrect sequence in application of Keyswitch, Interlock, Direction, or Throttle. 2. Faulty wiring, crimps, or switches at KSI, Interlock, Direction, or Throttle. 3. Moisture in above-noted digital input switches causing invalid (real) On/Off state. 4. Verify input switch status. See Programmer » System Monitor menu » Inputs » Switch Status. 5. Verify Throttle. See Programmer » System Monitor menu » Inputs » Throttle Command.	<i>Set:</i> HPD (High Pedal Disable) or SRO (Static Return to Off) sequencing fault caused by incorrect sequence of KSI, interlock, direction, and throttle inputs. <i>Clear:</i> Reapply inputs in correct sequence.	ShutdownThrottle

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS															
4-7 0x47	EMER Rev HPD <i>Emer_Rev_Hpd_Active</i> 0x2331 Fault Type(s): 1	1. Emergency Reverse operation has concluded, but the throttle, forward and reverse inputs, and interlock have not been returned to neutral.	<i>Set:</i> At the conclusion of Emergency Reverse, the fault was set because various inputs were not returned to neutral. <i>Clear:</i> If EMR_Interlock = On, clear the interlock, throttle, and direction inputs. If EMR_Interlock = Off, clear the throttle and direction inputs.	ShutdownThrottle ShutdownEMBrake															
4-9 0x49	Parameter Change <i>Parameter_Change_Active</i> 0x2813 Fault Type(s): Reports the CAN Object ID of parameter.	1. When Interlock is On, changing a safety-based parameter. Parameters with this property are marked with a [PCF] (Parameter Change fault) in the Parameter menu listings.	<i>Set:</i> Adjustment of a parameter setting that requires cycling of KSI. <i>Clear:</i> Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>															
4-10 0x4A	EMR Switch Redundancy <i>Emr_Switch_Redundancy_Active</i> 0x2817 Fault Type(s): 1	1. Either or both Emergency Reverse input switches are inoperative, resulting in an invalid state. <table><tr><td>NO</td><td>NC</td><td>State</td></tr><tr><td>On</td><td>Off</td><td>valid</td></tr><tr><td>Off</td><td>On</td><td>valid</td></tr><tr><td>On</td><td>On</td><td>invalid</td></tr><tr><td>Off</td><td>Off</td><td>invalid</td></tr></table> 2. Ingress of dirt or moisture in switch(s).	NO	NC	State	On	Off	valid	Off	On	valid	On	On	invalid	Off	Off	invalid	<i>Set:</i> Emer Rev Switch NO input does not agree with the Emer Rev Switch NC input. <i>Clear:</i> Correct switch states. <i>Reset Controller.</i>	ShutdownInterlock ShutdownEMBrake
NO	NC	State																	
On	Off	valid																	
Off	On	valid																	
On	On	invalid																	
Off	Off	invalid																	
5-1 0x51	User 1 Fault <i>User_{1, 2 ... 32}_Fault_Active</i> 0x2710 Fault Type(s): OEM Definable	1. These faults (and fault actions) can be defined by the User/OEM and are implemented in the application-specific VCL software. 2. See User/OEM documentation.	<i>Set:</i> See User/OEM documentation <i>Clear:</i> See User/OEM Documentation	See User/OEM Documentation															
5-2 0x52	User 2 Fault 0x2711	See User 1 fault (above)	<i>Set:</i> See User/OEM documentation <i>Clear:</i> See User/OEM Documentation	See User/OEM Documentation															
5-3 0x53	USER 3 FAULT 0x2712																		
5-4 0x54	USER 4 FAULT 0x2713																		
5-5 0x55	USER 5 FAULT 0x2720																		
5-6 0x56	USER 6 FAULT 0x2721																		
5-7 0x57	USER 7 FAULT 0x2722																		
5-8 0x58	USER 8 FAULT 0x2723																		
5-9 0x59	USER 9 FAULT 0x2730																		
6-1 0x61	USER 10 FAULT 0x2731																		
6-2 0x62	USER 11 FAULT 0x2732																		

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
6-3 0x63	USER 12 FAULT 0x2733	See User 1 fault (above)	<i>Set:</i> See User/OEM documentation <i>Clear:</i> See User/OEM Documentation	See User/OEM Documentation
6-4 0x64	USER 13 FAULT 0x2740			
6-5 0x65	USER 14 FAULT 0x2741			
6-6 0x66	USER 15 FAULT 0x2742			
6-7 0x67	USER 16 FAULT 0x2743			
5-10 0x5A	USER 17 FAULT 0x2750			
5-11 0x5B	USER 18 FAULT 0x2751			
5-12 0x5C	USER 19 FAULT 0x2752			
5-13 0x5D	USER 20 FAULT 0x2753			
5-14 0x5E	USER 21 FAULT 0x2760			
5-15 0x5F	USER 22 FAULT 0x2761			
6-10 0x6A	USER 23 FAULT 0x2762			
6-11 0x6B	USER 24 FAULT 0x2763			
6-12 0x6C	USER 25 FAULT 0x2770			
6-13 0x6D	USER 26 FAULT 0x2771			
6-14 0x6E	USER 27 FAULT 0x2772			
6-15 0x6F	USER 28 FAULT 0x2773			
7-10 0x7A	USER 29 FAULT 0x2780			
7-11 0x7B	USER 30 FAULT 0x2781			
7-12 0x7C	USER 31 FAULT 0x2782			
7-13 0x7D	USER 32 FAULT 0x2783			

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
6-8 0x68	VCL Run Time Error <i>VCL_Run_Time_Error_Active</i> 0x2820 Fault Type(s): 1	- Runtime errors are defined using the VCL Error Module and VCL Error. See the System Information file: - Curtis Software Suite™ » VCL Studio » Help - Using driver control commands in VCL can lead to VCL runtime errors if the VCL command and the driver assignment do not match.	<i>Set:</i> VCL Run Time Error detected <i>Clear:</i> Edit VCL application software to fix this error condition; flash the new compiled software and matching parameter settings; <i>Reset Controller.</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownInterlock</i> <i>ShutdownDriver1</i> <i>ShutdownDriver2</i> <i>ShutdownDriver3</i> <i>ShutdownDriver4</i> <i>ShutdownDriver5</i> <i>ShutdownPD</i> <i>FullBrake</i>
7-2 0x72	PDO Timeout <i>PDO_Timeout_Active</i> 0x2541 Fault Type(s): 1	- The time between CAN PDO messages received exceeded the PDO Timeout Period as defined by the Event Timer parameter. - Adjust PDO Settings. See Programmer » Application Setup » CAN Interface » PDO Setups.	<i>Set:</i> Time between CAN PDO messages received exceeded the PDO Timeout Period. <i>Clear:</i> Receive CAN NMT message, or <i>Reset Controller.</i>	<i>ShutdownThrottle</i>
7-3 0x73	Stall Detected <i>Stall_Detected_Active</i> 0x2231 Fault Type(s): 1	- Stalled motor. - Motor encoder failure. - Bad crimps or faulty wiring. - Problems with power supply for the motor encoder. - See Programmer » System Monitor menu » AC Motor » Motor RPM.	<i>Set:</i> No motor encoder movement detected. <i>Clear:</i> Either <i>Reset Controller</i>, or if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Stall Detected fault is cleared and the Encoder LOS fault (flash code 9-3) is set, allowing limited motor control.	<i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownMotor</i> Control Mode changed to LOS (Limited Operating Strategy).
7-7 0x77	Supervision <i>Supervision_Active</i> 0x2840 Fault Type(s): Curtis Supervision Code	Internal controller fault.	<i>Set:</i> Internal controller failure <i>Clear:</i> <i>Reset Controller.</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownInterlock</i> <i>ShutdownDriver1</i> <i>ShutdownDriver2</i> <i>ShutdownDriver3</i> <i>ShutdownDriver4</i> <i>ShutdownDriver5</i> <i>ShutdownPD</i> <i>FullBrake</i>
7-9 0x79	Supervision Input Check <i>Supervision_Input_Check Active</i> 0x2841 Fault Type(s): 1	Internal controller fault.	<i>Set:</i> Damaged Controller. <i>Clear:</i> <i>Reset Controller.</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>ShutdownInterlock</i> <i>ShutdownDriver1</i> <i>ShutdownDriver2</i> <i>ShutdownDriver3</i> <i>ShutdownDriver4</i> <i>ShutdownDriver5</i> <i>ShutdownPD</i> <i>FullBrake</i>
8-2 0x82	PDO Mapping Error <i>PDO_Mapping_Error_Active</i> 0x2542 Fault Type(s): 1	- The PDO Map has too many data bytes assigned or has objects mapped that are not compatible. - Adjust PDO Settings. See Programmer » Application Setup » CAN Interface » PDO Setups.	<i>Set:</i> Incorrect PDO map detected. <i>Clear:</i> <i>Reset Controller.</i>	PDO message disabled

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
8-3 0x83	Internal Hardware <i>Internal_Hardware_Active</i> 0x2835 Fault Type(s): Curtis hardware code	1. Internal controller fault detected.	<i>Set:</i> Internal controller fault detected. <i>Clear:</i> Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
8-7 0x87	Motor Characterization Error <i>Motor_Characterization_Active</i> 0x2850 Fault Type(s): 71 Failure to write NV ram 72 Temp sensor fault 73 Motor hot 74 Controller temperature cutback 76 Undervoltage cutback 77 Overvoltage cutback 78 No encoder information 79 Current Regulator Tuning out of range 80 Current Regulator Tuning out of range 81 Encoder signal seen but step size not auto-detected 82 Aborted autocharacterization — 90/98 PMAC Sin/Cos no rotation detected 91 PMAC motor not rotating 92 PMAC Motor not accelerating. Low acceleration 94–97 PMAC lag compensation out of range 99 PMAC Motor rotating at start of characterization 102 PMAC motor temp sensor 103 PMAC motor temp hot cutback 104 PMAC controller temp cutback 106 PMAC Undervoltage cutback 107 PMAC overvoltage cutback	1. Motor characterization failed during characterization process. See fault type for cause.	<i>Set:</i> Motor characterization failed during the motor characterization process. <i>Clear:</i> Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
8-8 0x88	Encoder Pulse Error <i>Encoder_Pulse_Error_Active</i> 0x2234 Fault Type(s): 1	1. Encoder Steps parameter does not match the actual motor encoder. 2. Verify parameter settings: AC Motor Setup » Quadrature Encoder » Encoder Steps.	<i>Set:</i> Detected wrong setting of the Encoder Steps parameter. <i>Clear:</i> Ensure the Encoder Steps parameter matches the actual encoder; <i>Reset Controller.</i>	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
8-9 0x89	Parameter Out of Range <i>Parameter_Out_Of_Range_Active</i> 0x2811 Fault Type(s): Reports the CAN Object ID of parameter.	1. Parameter value detected outside of the limits. 2. Use CSS to view and write parameter value and range.	<i>Set:</i> Parameter detected outside of limits <i>Clear:</i> Bring parameter within its limits.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>
9-2 0x92	EM Brake Failed To Set <i>EM_Brake_Failed_to_Set_Active</i> 0x2321 Fault Type(s): 1	1. Vehicle movement sensed after the EM Brake has been commanded to set. 2. EM Brake will not hold the motor from rotating.	<i>Set:</i> After the EM Brake was commanded to set and time has elapsed to allow the brake to fully engage, vehicle movement has been sensed. <i>Clear:</i> 1. Activate the Throttle (EM Brake type 2). 2. Activate the Interlock (EM Brake type 1).	ShutdownEMBrake ShutdownThrottle Position Hold is engaged when Interlock = On.
9-3 0x93	Encoder LOS <i>Encoder_LOS_Active</i> 0x2233 Fault Type(s): 1	1. Limited Operating Strategy (LOS) control mode has been activated; as a result of either an Encoder Fault (flash code 3-6) or a Stall Detected fault (flash code 7-3). 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Vehicle is stalled.	<i>Set:</i> Encoder Fault (flash code 3-6) or Stall Detected (flash code 7-3) was activated, if parameter LOS Upon Encoder Fault = On and Interlock has been cycled, then the Encoder LOS (flash code 9-3) control mode is activated, allowing limited motor control. <i>Clear:</i> Cycle KSI or, if LOS Mode was activated by the Stall Detected fault, clear by ensuring encoder senses proper operation, Motor RPM = 0, and Throttle Command = 0.	LOS Mode
9-4 0x94	Emer Rev Timeout <i>Emer_Rev_Timeout_Active</i> 0x2330 Fault Type(s): 1	1. Emergency Reverse was activated and concluded because the EMR Timeout timer has expired. 2. The emergency reverse input is stuck On.	<i>Set:</i> Emergency Reverse was activated and ran until the EMR Timeout timer expired. <i>Clear:</i> Turn the emergency reverse input (switch) to Off.	ShutdownThrottle ShutdownEMBrake
9-9 0x99	Parameter Mismatch <i>Parameter_Mismatch_Active</i> 0x2812 Fault Type(s): 1 = Dual Drive is enabled in Torque Mode. 2 = Motor Tech = SPMSM, Feedback = Encoder 3 = Motor Tech = ACIM, Feedback = Sin/Cos	1. Incorrect position feedback type chosen for motor technology in use. 2. Dual drive is enabled in torque mode. 3. Dual drive enabled on only one controller.	<i>Set:</i> 1. When the Dual Drive software is enabled, the controller must be set to either Speed Mode Express or Speed Mode; otherwise this fault is set. 2. Motor Technology = 1 must be paired with Feedback Type = 2; otherwise this fault is set. 3. Motor Technology = 0 must be paired with Feedback Type = 1; otherwise this fault is set. <i>Clear:</i> Adjust parameters to appropriate values and then Reset Controller.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSE	SET / CLEAR CONDITIONS	FAULT ACTIONS
9-10 0x9A	Interlock Braking Supervision <i>Interlock_Braking_Supervision_Active</i> 0x2332 Fault Type(s): 1 Motor speed is outside the Interlock Brake Supervision Speed Limit. 2 Interlock is Off and EM Brake not applied within time limit. 3 Interlock is Off and EM Brake not applied, and the rotor position is outside the RPM-position limit.	1. During an interlock braking event, the motor speed exceeded the limit set by the Interlock Braking Supervision parameters. 2. See Programmer » Application Setup » Interlock Braking » Supervision Enable. 3. See Programmer » Application Setup » Interlock Braking » Interlock Braking Supervision.	<i>Set:</i> During an interlock braking event, the motor speed exceeded the limit set by the Interlock Braking Supervision parameters. <i>Clear:</i> <i>Reset Controller.</i>	ShutdownMotor ShutdownEMBrake ShutdownMainContactor
9-11 0x9B	EMR Supervision <i>Emr_Supervision_Active</i> 0x2333 Fault Type(s): 1	1. During an EMR event, the motor speed exceeded the limit set by the Emergency Reverse Supervision parameters. 2. See Programmer » Application Setup » Emergency Reverse » Emergency Reverse Supervision.	<i>Set:</i> During an interlock braking event, the motor speed exceeded the limit set by the Emergency Reverse Supervision parameters. <i>Clear:</i> <i>Reset Controller.</i>	ShutdownMotor ShutdownEMBrake ShutdownMainContactor
10-1 0xA1	Driver 1 Fault <i>Driver_1_Fault_Active</i> 0x2160 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring. 4. Driver overcurrent, as set by the Driver 1 Overcurrent parameter. 5. See Programmer » Controller Setup » Outputs » Driver 1 » Driver 1 Overcurrent.	<i>Set:</i> Driver 1 is either open or shorted. Or Driver 1 exceeded its overcurrent setting. <i>Clear:</i> Correct open or short, and then <i>Reset Controller.</i>	ShutdownDriver1
10-2 0xA2	Driver 2 Fault <i>Driver_2_Fault_Active</i> 0x2161 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring. 4. Driver overcurrent, as set by the Driver 2 Overcurrent parameter. 5. See Programmer » Controller Setup » Outputs » Driver 2 » Driver 2 Overcurrent.	<i>Set:</i> Driver 2 is either open or shorted. Or Driver 2 exceeded its overcurrent setting. <i>Clear:</i> Correct open or short, and then <i>Reset Controller.</i>	ShutdownDriver2
10-3 0xA3	Driver 3 Fault <i>Driver_3_Fault_Active</i> 0x2162 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring. 4. Driver overcurrent, as set by the Driver 3 Overcurrent parameter. 5. See Programmer » Controller Setup » Outputs » Driver 3 » Driver 3 Overcurrent.	<i>Set:</i> Driver 3 is either open or shorted. Or Driver 3 exceeded its overcurrent setting. <i>Clear:</i> Correct open or short, and then <i>Reset Controller.</i>	ShutdownDriver3

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
10-4 0xA4	Driver 4 Fault <i>Driver_4_Fault_Active</i> 0x2163 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring. 4. Driver overcurrent, as set by the Driver 4 Overcurrent parameter. 5. See Programmer » Controller Setup » Outputs » Driver 4 » Driver 4 Overcurrent.	<i>Set:</i> Driver 4 is either open or shorted. Or Driver 4 exceeded its overcurrent setting. <i>Clear:</i> Correct open or short, and then <i>Reset Controller</i> .	ShutdownDriver4
10-5 0xA5	Driver 5 Fault <i>Driver_5_Fault_Active</i> 0x2164 Fault Type(s): 1 = Driver Short 2 = Driver Overcurrent 3 = Open/Short (High, should be Low) 4 = Open/Short (Low, should be High) 5 = Driver Open	1. Open or short on driver load. 2. Dirty connector pins at controller or contactor coil. 3. Bad connector crimps or faulty wiring. 4. Driver overcurrent, as set by the Driver 5 Overcurrent parameter. 5. See Programmer » Controller Setup » Outputs » Driver 5 » Driver 5 Overcurrent.	<i>Set:</i> Driver 5 is either open or shorted. Or Driver 5 exceeded its overcurrent setting. <i>Clear:</i> Correct open or short, and then <i>Reset Controller</i> .	ShutdownDriver5
10-8 0xA8	Driver Assignment <i>Driver_Assignment_Active</i> 0x2632 Fault Type(s): 5 {X} = Driver number that cause the fault	1. A Driver Output is used for two or more functions. 2. See Programmer » Controller Setup » IO Assignments » Coil Drivers: Main Contactor Driver, EM Brake Driver, Hydraulic Contactor Driver.	<i>Set:</i> Driver assignment conflict <i>Clear:</i> Resolve the conflicted driver assignment, then <i>Reset Controller</i> .	ShutdownDriver{X} (Driver in non-operational)
11-1 0xB1	ANALOG 1 OUT OF RANGE <i>Analogue_1_Out_Of_Range</i> 0x2620 <i>Analogue_X_Out_of_Range</i> Fault Type(s): 1 = above High limit 2 = below Low limit	1. Analog 1 input voltage above the parameter setting of Analog 1 High. 2. Analog 1 input voltage is below the parameter setting of Analog 1 Low. 3. See Programmer » Controller Setup » Analog Inputs » Analog 1. 4. See Programmer » Controller Setup » Analog Inputs » Configure » Analog 1 Low/Analog 1 High.	<i>Set:</i> (1) Input voltage (on pin) is above the parameter's set-point threshold. (2) Input voltage (on pin) is below the parameter's set-point threshold. <i>Clear:</i> Return the voltage to within the allowed range, then <i>Reset Controller</i> .	None, unless a fault action is programmed in VCL.
11-2 0xB2	ANALOG 2 OUT OF RANGE <i>Analogue_2_Out_Of_Range</i> 0x2621	See Analog 1 Out of Range.	See Analog 1 Out of Range	None, unless a fault action is programmed in VCL.
11-3 0xB3	ANALOG 3 OUT OF RANGE <i>Analogue_3_Out_Of_Range</i> 0x2622	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.
11-4 0xB4	ANALOG 4 OUT OF RANGE <i>Analogue_4_Out_Of_Range</i> 0x2623	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.
B-5 0xB5	ANALOG 5 OUT OF RANGE <i>Analogue_5_Out_Of_Range</i> 0x2624	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.

Table 16 AC F2-A Controller Troubleshooting Chart, cont'd

FLASH CODE	FAULT NAME (Curtis Software Suite™)	POSSIBLE CAUSES	SET/CLEAR CONDITIONS	FAULT ACTIONS
11-6 0xB6	ANALOG 6 OUT OF RANGE <i>Analog_6_Out_Of_Range</i> 0x2625	See Analog 1 Out of Range.	See Analog 1 Out of Range	None, unless a fault action is programmed in VCL.
11-7 0xB7	ANALOG 7 OUT OF RANGE <i>Analog_7_Out_Of_Range</i> 0x2626	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.
11-8 0xB8	ANALOG 8 OUT OF RANGE <i>Analog_8_Out_Of_Range</i> 0x2627	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.
11-11 0xBB	ANALOG 14 OUT OF RANGE <i>Analog_14_Out_Of_Range</i> 0x262A	See Analog 1 Out of Range.	See Analog 1 Out of Range.	None, unless a fault action is programmed in VCL.
11-12 0xBC	Analog Assignment <i>Analog_Assignmnt_Active</i> 0x2631 Fault Type(s): 9 {X = 1–8, 14} X = Analog Input number that caused the fault	1. An Analog Input is used for two or more functions. 2. An Analog Input is outside the range of analog inputs. 3. See Programmer » Controller Setup » IO Assignments » Controls.	<i>Set:</i> An Analog Input is used for two or more functions or is outside the range of analog inputs <i>Clear:</i> Resolve assignment conflict, and then <i>Reset Controller</i> .	None, unless a fault action is programmed in VCL.
12-1 0xC1	Branding Error <i>Branding_Error_Active</i> 0x2860 Fault Type(s): 1	1. Software and hardware branding mismatch. 2. For technical support on this fault, contact the Curtis distributor where you obtained your controller or the Curtis sales-support office in your region.	<i>Set:</i> Software/Hardware incompatibly. <i>Clear:</i> As applicable: Load Branded software, or use Branded controller with the correct device profile and the correct Curtis Software Suite toolkit key.	<i>ShutdownMotor</i> <i>ShutdownMainContactor</i> <i>ShutdownEMBrake</i> <i>ShutdownThrottle</i> <i>FullBrake</i>