

Product Manual 1600, 1600i and 3200i

- | | |
|--|----------------------------------|
| 1 Introduction | 5 Installation and commissioning |
| 2 Dimensions and typical applications | 6 Customer presets and log |
| 3 Installation guidelines for EMC | 7 Trouble shooting guide |
| 4 Terminal specification and block diagram | 8 Detailed specification |

Please read and understand this manual prior to installing the unit. Please obtain expert help if you are not qualified to install this equipment. Make the safety of your installation a priority. This component is hazardous.

Introduction. Models 1600, 1600i, 3200i

Sprint Electric offers a family of D.C. THYRISTOR drive modules all with the same features and terminals. The user selects the appropriate model depending on required power output and the need for isolated electronics. The 1600 is NON-ISOLATED. The 1600i and the 3200i have isolated control electronics

DRIVE TYPE	AC SUPPLY VOLTAGE	AMERICAN OPTIONS	NOMINAL OUTPUT	MAX. CURRENT	PRODUCT DISSIPATION at full current	ISOLATION
1600/LV	60/30		48/24V	16 AMPS	50 watts	NON ISOLATED
1600	240/110		180/90V	16 AMPS	50 watts	NON ISOLATED
1600i/LV	60/30		48/24V	16 AMPS	50 watts	ISOLATED
1600i	240/110		180/90V	16 AMPS	50 watts	ISOLATED
3200i/LV	60/30		48/24V	8/16/32/48 AMPS	25/50/100/150 watts	ISOLATED
3200i	415/240	240/110	320/180V(90 US)	8/16/32/48 AMPS	25/50/100/150 watts	ISOLATED

All types are of open chassis construction for use in a suitable enclosure

GENERAL DESCRIPTION

The units employ closed loop control of both armature current and feedback voltage to give precise control of the motor torque and speed. The motor and drive are protected by a stall timer which automatically removes power after 30 seconds if the required speed cannot be achieved. The drives will provide up to 150% of the preset maximum current for up to 30 seconds allowing high short term torques during acceleration etc. Independant control of either the current or speed loops by external inputs allows torque or speed control applications with overspeed or overcurrent protection. The demand signal may be derived from a potentiometer, 0-10V signal or 4-20mA loop. The speed feedback signal may be selected to be the ARMATURE VOLTAGE or a shaft mounted TACHOMETER.

INPUTS AND OUTPUTS

+aux input	speed output	+24V unregulated output
-aux input	current output	+12V regulated output
current input	ramp output	+10V precision reference
4-20mA input	demand output	-12V regulated output
0 to 10V input	zero/stall relay	-24V unregulated output

ADJUSTABLE PARAMETERS

Max speed	Up ramp	Max current	Stability
Min speed	Down ramp	IR comp	

SWITCHED FUNCTIONS

Maximum current range	Maximum feedback	Tacho feedback
Relay function	Power up hold	AV feedback

JUMPER FUNCTIONS

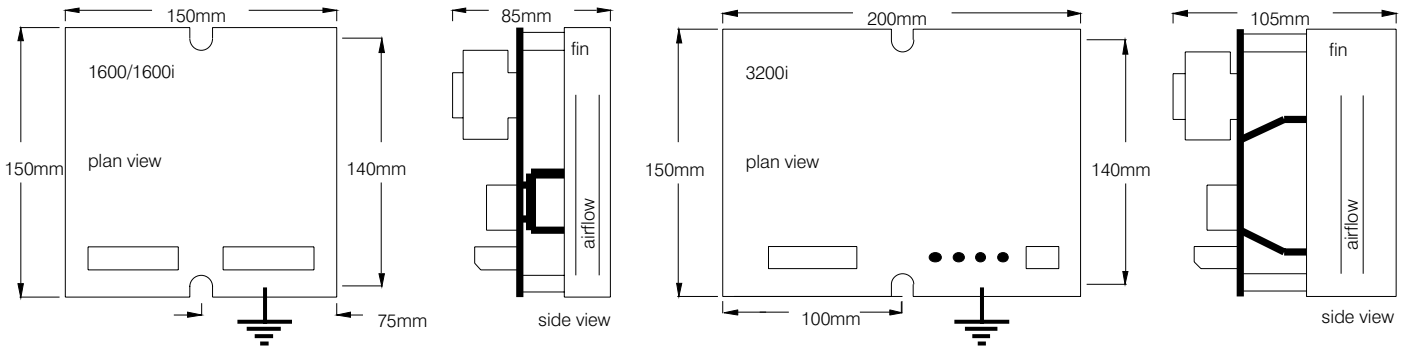
Torque mode	Dual supply voltage	Phase angle limit
Zero reference interlock	4-20mA input	50% stall threshold

PERFORMANCE FEATURES

Dual loop control	Precision tacho rectifier	Compact design
Relay driver o/ps	International compatability	Systems inputs/outputs

MECHANICAL DIMENSIONS

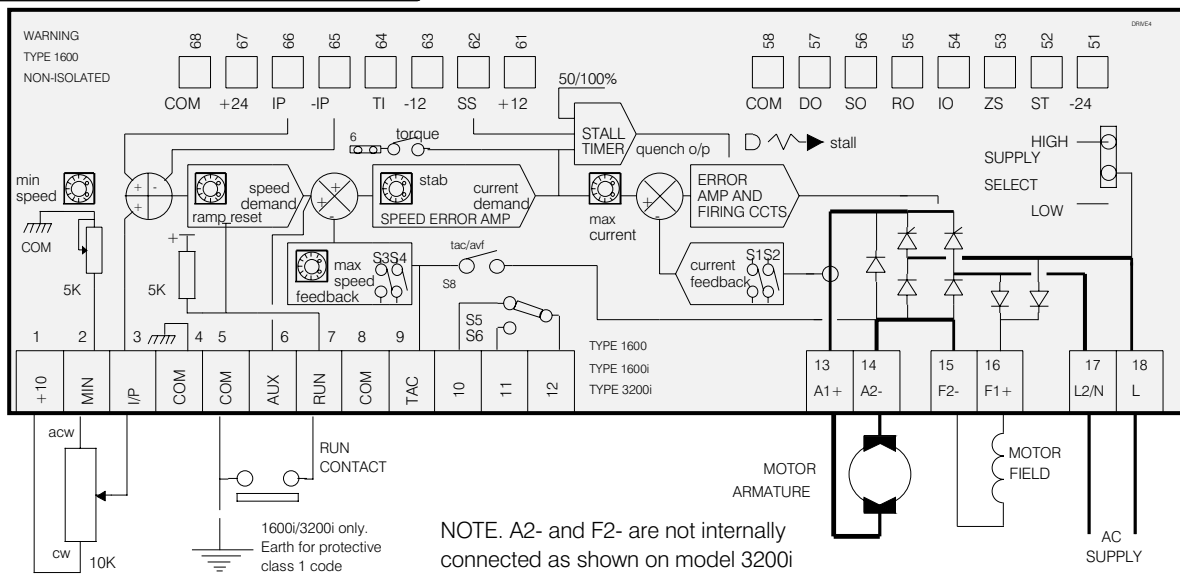
Note. Dissipation in watts is approx. 2 X arm. amps



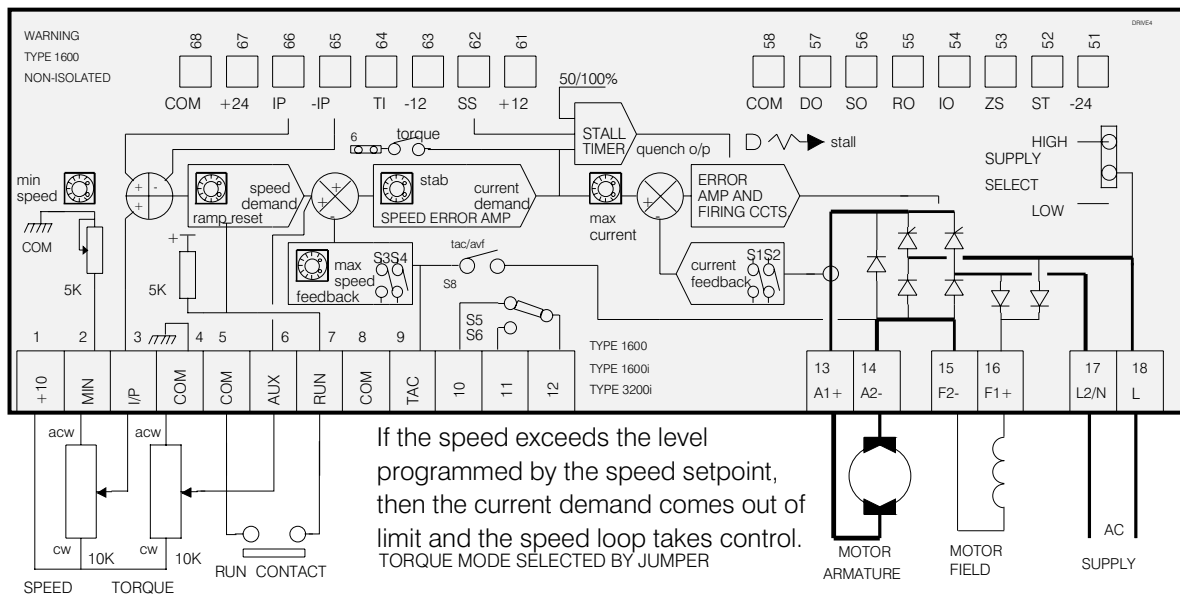
The unit should have a substantial earth connected to the heatsink earth screw provided. Employ a star washer adjacent to the heatsink for optimum earth continuity. The fixing bolts should be 5mm by 35mm for the 1600/1600i and 5mm by 50mm for the 3200 series.

TYPICAL APPLICATIONS

BASIC CONNECTION



TORQUE CONTROL WITH OVERSPEED LIMITING BY SEPERATE SPEED SETPOINT.



SPRINT ELECTRIC LTD. DOES NOT ACCEPT ANY LIABILITY WHATSOEVER FOR THE INSTALLATION, FITNESS FOR PURPOSE OR APPLICATION OF ITS PRODUCTS. IT IS THE USERS RESPONSIBILITY TO ENSURE THE UNIT IS CORRECTLY USED AND INSTALLED.

HEALTH AND SAFETY AT WORK. ELECTRICAL DEVICES CONSTITUTE A SAFETY HAZARD. IT IS THE RESPONSIBILITY OF THE USER TO ENSURE COMPLIANCE WITH ANY ACTS OR BYLAWS IN FORCE. ONLY SKILLED PERSONS SHOULD INSTALL THIS EQUIPMENT.

INSTALLATION GUIDE FOR SYSTEMS USED IN THE EU

Special consideration must be given to installations in member states of the European Union regarding noise suppression and immunity. According to IEC 1800-3 (EN61800-3) the drive units are classified as complex components only for professional assemblers, with no CE marking for EMC. The drive manufacturer is responsible for the provision of installation guidelines. The resulting EMC behaviour is the responsibility of the manufacturer of the system or installation. The units are subject to the LOW VOLTAGE DIRECTIVE 73/23/EEC and are CE marked accordingly.



Following the procedures outlined below will normally be required for the drive system to comply with the European regulations, some systems may require different measures. Installers must have a level of technical competence to correctly install. Although the drive unit itself is not subject to the EMC directive, considerable development work has been undertaken to ensure that the noise emissions and immunity are optimised.

* EN61800-3 specifies 2 alternative operating environments. These are the domestic (1st environment) and industrial (2nd environment). There are no limits specified for conducted or radiated emissions in the industrial environment, hence it is usual for the filter to be omitted in industrial systems.

Definition of an industrial environment. All establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes.

DRIVE INSTALLATION REQUIREMENTS FOR EMC COMPLIANCE

Keep parallel runs of power and control cables at least 0.3m apart. Crossovers must be at right angles

Keep sensitive components at least 0.3m from the drive and power supply cables

The AC connections from the filter to the drive must be less than 0.3m or if longer, correctly screened

Do not run filtered and unfiltered AC supply cables together

Control signals must be filtered or suppressed eg control relay coils and current carrying contacts. The drive module has built in filters on signal outputs

The AC supply filter must have a good earth connection to the enclosure back plane. Take care with painted metal to ensure good conductivity.

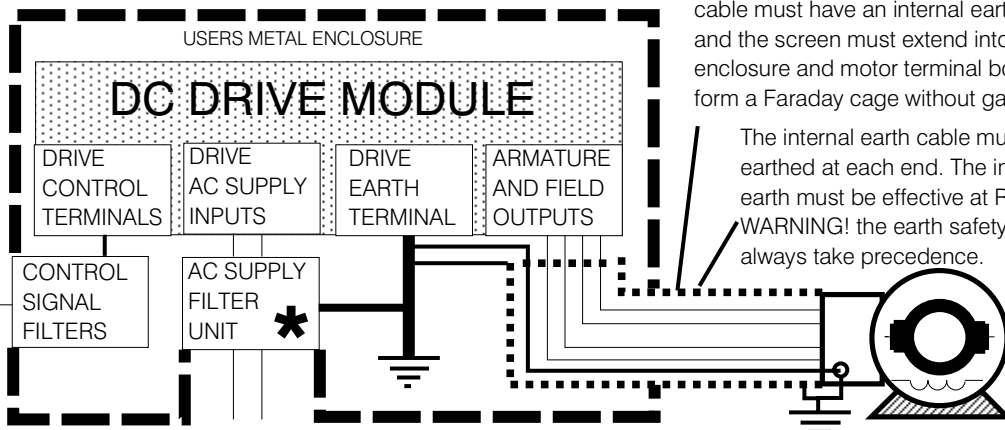
The AC input filter has earth leakage currents. Earth RCD devices may need to be set at 5% of rated current

The metal enclosure will be the RF ground. The AC filter, drive earth and motor cable screen should connect directly to the metal of the cabinet for best performance

Linear control signal cables must be screened with the screen earthed at the drive end only. Minimise the length of screen stripped back and connect it to an analogue earth point

The motor cable must be screened or armoured with 360 degree screen terminations to earth at each end. The cable must have an internal earth cable and the screen must extend into the enclosure and motor terminal box to form a Faraday cage without gaps

The internal earth cable must be earthed at each end. The incoming earth must be effective at RF. **WARNING!** the earth safety must always take precedence.



IMPORTANT SAFETY WARNINGS



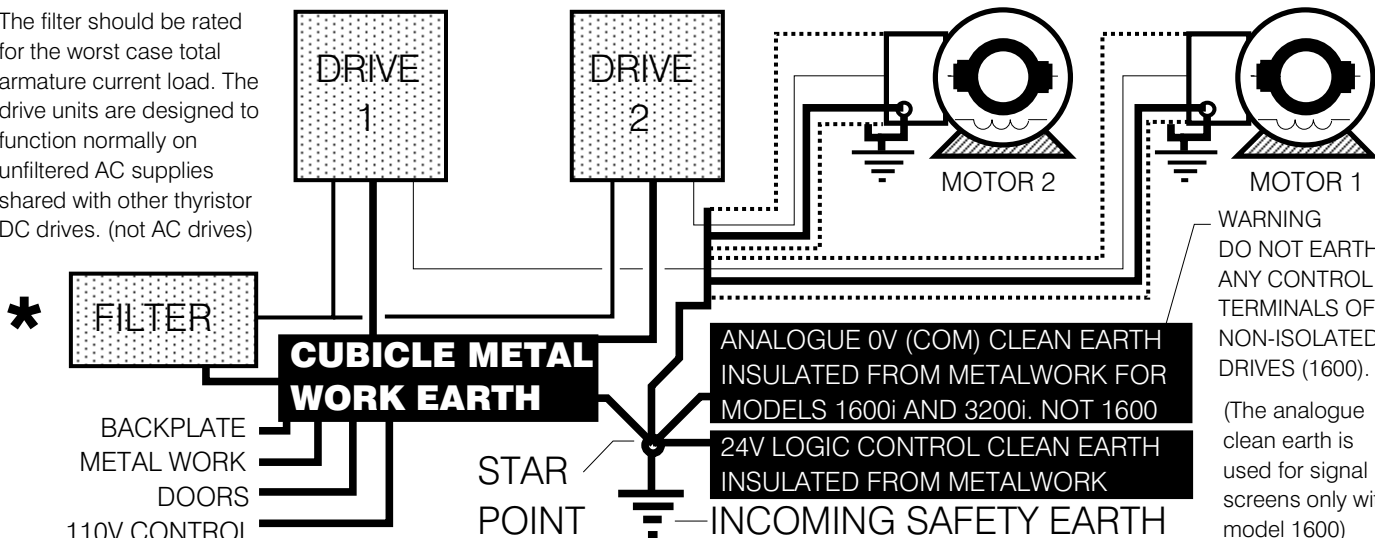
The AC supply filters must not be used on supplies that are un-balanced or float with respect to earth

The drive and AC filter must only be used with a permanent earth connection. No plugs/sockets are allowed in the AC supply

The AC supply filter contains high voltage capacitors and should not be touched for a period of 20 seconds after the removal of the AC supply

MULTIPLE DRIVES WITH ONE FILTER AND EARTHING METHODS

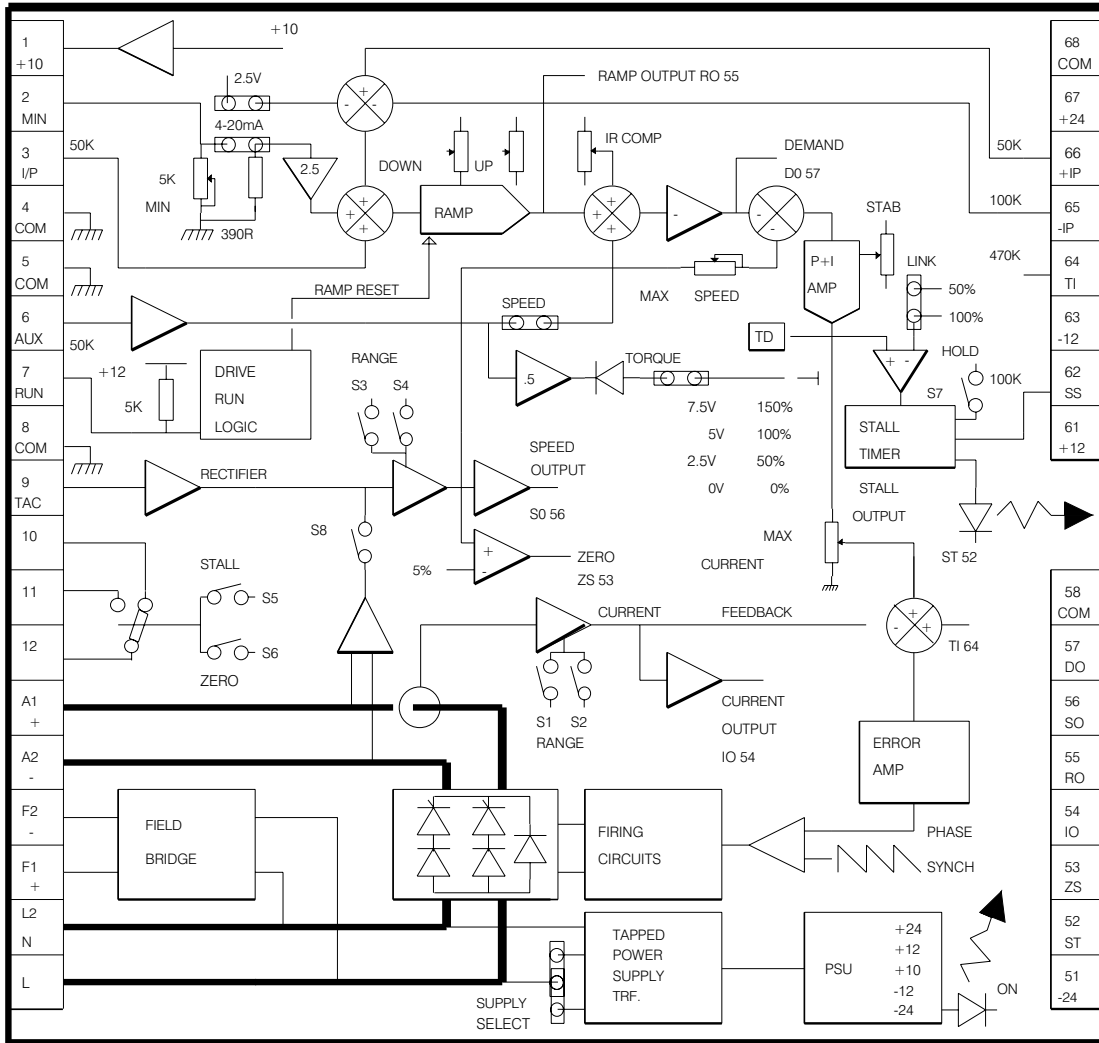
The filter should be rated for the worst case total armature current load. The drive units are designed to function normally on unfiltered AC supplies shared with other thyristor DC drives. (not AC drives)



WARNING
DO NOT EARTH ANY CONTROL TERMINALS OF NON-ISOLATED DRIVES (1600).

(The analogue clean earth is used for signal screens only with model 1600)

Block diagram and terminal specification.



1 +10V PRECISION REFERENCE 10mA MAX. SHORT CTT. PROOF

2 MINIMUM END OF SETPOINT POT OR 4-20 mA CURRENT LOOP I/P

3 SPEED DEMAND INPUT 0-10V FOR 0-100% SPEED

4 COMMON. (4-20mA RETURN)

5 COMMON. (connect to earth for protective class 1 on 1600i and 3200i)
WARNING DO NOT EARTH 1600, this product is non-isolated

6 AUXILIARY INPUT. ON BOARD JUMPER SELECTS DIRECT SPEED OR TORQUE MODE. 0-10V FOR 0-100% CONTROL

7 CONNECT TO COMMON TO RUN 60ms ON / 20ms OFF

(WARNING. RUN is an electronic inhibit function. The field remains energised, and all power terminals remain 'live'. RUN must not be relied upon during hazardous operations)

8 COMMON (internally connected to T4, T5, T58, T68)

9 TACHO INPUT 25-400V FULL SCALE. + OR - POLARITY

10 RELAY CONTACT NC
11 RELAY CONTACT NO
12 RELAY POLE

RELAY CONTACT RATING 1 AMP 240V AC
RATINGS ACCORDING TO CSA
VOLTAGE RATING OF RELAY
TERMINALS 10/11/12 MUST NOT EXCEED 30V AC OR 42.4V DC.

A1+ ARMATURE OUTPUT

A2-ARMATURE OUTPUT

F2- FIELD OUTPUT THE 3200i HAS TWO 2A FUSES WHICH PROTECT THE FIELD AND POWER SUPPLY TRANSFORMER ONLY. FOR A HALF WAVE FIELD VOLTAGE CONNECT FIELD TO F2- AND L2/N. THIS WILL GIVE AN OUTPUT OF 0.45 TIMES THE AC SUPPLY

F1+ FIELD OUTPUT

L2/N AC SUPPLY INPUT ACCORDING TO SUPPLY SELECT JUMPER

L AC SUPPLY INPUT ACCORDING TO SUPPLY SELECT JUMPER

68 DRIVE COMMON

67 +24V OUTPUT 25mA MAXIMUM DO NOT SHORT

66 AUXILIARY SPEED INPUT 0 TO 10V FOR 0-100% RAMPED SPEED

65 AUX. INVERTING SPEED INPUT 0 TO -10V FOR 0-100% RAMPED SPEED

64 INPUT TO CURRENT LOOP. 0-5V FOR 0-100% CURRENT

63 -12V OUTPUT 10mA MAX. DO NOT SHORT.

62 STOP/START INPUT. CLOSE TO -12V TO ACTIVATE STALL CONDITION. CLOSE TO +12V TO RELEASE STALL CONDITION.

61 +12V OUTPUT 10mA MAX. DO NOT SHORT.

58 DRIVE COMMON

57 SPEED DEMAND O/P 0 TO -10V REPRESENTS 0-100% DEMAND. OUTPUT IMPEDANCE 1K OHMS

56 SPEED OUTPUT. TYPICALLY 7.5V FULL SCALE. ADJUSTMENT OF MAX SPEED PRESET WILL ALTER THE FULL SCALE READING FROM 4V (ACW) TO 9V (CW).

55 SETPOINT RAMP OUTPUT 0-10V. IMPEDANCE 1K OHMS

54 CURRENT OUTPUT 0-5V FOR 0-100% OF CHOSEN RANGE (S1, S2). 1K IMPEDANCE.

53 ZERO SPEED RELAY DRIVER O/P MAX 100mA

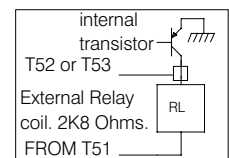
Switches to -24V

52 STALL RELAY DRIVER O/P MAX 100mA

Switches to -24V

51 -24V RELAY SUPPLY 25mA DO NOT SHORT

SIGNAL PADS ON TOP EDGE (TERMINAL COMPATIBLE)



INSTALLATION AND COMMISSIONING

Ensure supply is disconnected before working on unit

POWER CABLING

Use correctly rated cable minimum 600V AC 2 times armature current

FUSING

The drives MUST BE FUSED EXTERNALLY with semiconductor fuses. The fuses must be rated at 1.75 times armature current and have an I²t rating lower than the value listed in the specification page 8. Any warranty will be invalid if the fusing is incorrect.

CONTROL SIGNALS

All control inputs to the 1600 are NON- ISOLATED. Do not connect any terminal to earth or other non-isolated voltage. The 1600i and 3200i have isolated control terminals, and may be connected to other systems. Avoid running signal cables close to power cables.

SUPPRESSION

The drives have excellent noise immunity. However installations involving electrical welding or RF induction heating may require further filters on the line and armature terminals. Contactor coils and sparking contacts may also require suppression. A 100R in series with 0.1uF cap. is usually adequate in these situations. Refer to page 3 for EMC guidelines.

PRESETS, SWITCHES, JUMPERS

Always use the correct insulated adjustment tools. Do not touch. Electric shock hazard exists!

MECHANICAL

Optimise heatsink airflow. Avoid vibration and ambient temps outside -10C and +40C. Protect the drive from pollutants.

MOTOR

Foot mounted motors must be level and secure. Protect motors from ingress of foreign matter during installation. Ensure accurate alignment of motor shaft with couplings. Do not hammer pulleys or couplings onto the motor shaft. Before running the motor complete the following check list.

- 1) Correct insulation resistance between all windings and earth with all drive cables disconnected
- 2) Check inside connection box for foreign objects, damaged terminals etc.
- 3) Check that brushes are in good condition, correctly seated and free to move in brush boxes. Check correct action of brush springs.
- 4) Motor vents must be freed of any obstruction or protective covers prior to running.
- 5) WARNING reversing systems. Do not transpose the armature connections until the motor has stopped. Failure to heed this warning will cause damage.

SUPPLY

Please ensure that the supply selection jumper on the drive matches the incoming supply. Failure to do this may result in permanent damage to the drive unit and will invalidate any warranty.

INITIAL SETTINGS

The drive units are shipped to run on the highest supply option at nominal speed, in ARMATURE VOLTAGE feedback mode, in the lowest current range. To change this run through switches S1 to S8 and select accordingly.

S1 S2	Set switches to give desired current range
S3 S4	SPEED. Calculate desired full scale feedback voltage and select range. Adjust within the range by using the MAX SPEED preset. Feedback may be tacho OR armature.
S5 S6	Select according to desired relay function
S7	Normally OFF. When on, the power up inhibit function will operate. Reset with T62.
S8	ON for Armature voltage feedback. OFF for Tacho feedback.

PRESET POT SETTINGS

MAX CURRENT. cw rotation gives 0 to 100% current limit. eg. 50% rotation gives 50% current limit. Check motor rating plate to find correct limit. (S1 S2 can provide 4 current ranges)

Anticlockwise	MIN SPEED UP RAMP	DOWN RAMP IR COMP
Midway	STAB	

POWER ON

 Check ON lamp lights

CLOSE RUN CONTACT (see caution note on page 6)
Gradually increase external setpoint, check motor rotation. If the direction is wrong, TURN OFF and swap A+, A-

INCREASE SETPOINT.

Drive should ramp up to full speed. Fine adjust with MAX SPEED preset. Do not exceed armature voltage rating. Reduce setpoint, drive should ramp down to zero. Adjust MIN SPEED to desired level. Run motor up and down and adjust RAMPS.

STABILITY

Adjust STAB to improve response if necessary. Clockwise rotation gives faster response. Excessive rotation in either direction may lead to instability depending on load.

IR COMP

Speed droop may occur where armature voltage feedback is used. This is compensated for by clockwise rotation of IR COMP preset. Excessive rotation may lead to instability. No IR COMP is required for systems with tacho feedback.

TORQUE SYSTEMS

See typical applications. In this mode the lowest setpoint has priority. Hence the speed setpoint is set to demand a speed slightly in excess of the working speed, and then the torque setpoint will always be operating as a limit. In the event of a web break for example, the motor will only run up to the level set on the speed pot.

LAMPS

- ON** On indicates AC power is applied
- STALL** Stall lamp lights and drive quenches if stall timer trips. see below for description of timer characteristics.

PRESETS

- MAX SPEED** Rotate clockwise to increase speed. Change range with S3 and S4
- MIN SPEED** Rotate clockwise to increase minimum speed. Use to adjust 4-20mA loop burden resistor between 0 and 390R if 4-20mA mode is selected.
- UP RAMP** Rotate clockwise to increase drive acceleration. Span 1 to 30 seconds

- DOWN RAMP** Rotate clockwise to increase drive deceleration. Span 1 to 30 seconds. Note, natural coast down is a limit.

- STAB** Rotate clockwise to increase response. Excessive rotation may cause instability. If rated motor voltage is much lower than AC supply then anticlockwise is preferred.

- IR COMP** Rotate clockwise to increase level of armature voltage droop compensation. Excessive rotation may cause instability. Always set fully anticlockwise with tachometer.

- MAX CURRENT** Rotate clockwise to increase current. Use S1 and S2 to select range



Anticlock



Midway



Clockwise

CUSTOMER PRESETS AND LOG

ON

STALL

MAX SPEED

MIN SPEED

UP RAMP

DOWN RAMP

STAB

IR COMP

MAX CURRENT

TORQUE SPEED

LINK FOR 4-20mA

50% STALL THRESHOLD

These two switches allow four maximum current ranges to be selected. 100% represents the maximum unit rating. The MAX CURRENT PRESET can be used to adjust from 0% to the selected maximum percentage

S1	both off	S1 on	0-75%	both on
S2	0-25%	S2 on	0-50%	0-100%

These two switches allow four maximum feedback voltage ranges to be selected. Use the MAX SPEED PRESET to adjust within the range. The drive will control from 0V to the selected maximum for a 0-10V input

S3	both off	S3 on	100-200V	both on
S4	25-50V	S4 on	50-100V	200-400V

These two switches allow the function of the relay to be determined

S5 when on the relay remains energised until a stall condition occurs

S6 when on the relay is energised for speeds above 5% of full scale. With both switches on, the relay de-energises when a stall condition occurs AND the motor speed has fallen below 5% of full scale

S7 **HOLD**. when on the drive will power up in a stall condition. It may be reset by momentarily shorting pad T61 to T62. (top edge)

S8 This switch allows the selection of the source of speed feedback. When on the ARMATURE VOLTAGE is selected. When off, a tachometer.

SUPPLY SELECT This jumper selects the appropriate supply tap on the control transformer. Refer to specification for tolerances. CHECK model type
 1) 240/110V AC or 2) 60/30V AC

terminal 1 on

terminal 2 is loop I/P compliance 5V. terminal 4 return (0 - 20mA link lower pair only)

terminal 6 becomes TORQUE input, in SPEED position, terminal 6 is direct speed I/P

terminal 10 TACHO

terminal 11

terminal 12

STANDARD	WITH 50% THRESHOLD
150% 30 secs	150% 15 seconds
125% 60 secs	100% 30 seconds
115% 120 secs	75% 60 seconds
100% no trip	50% no trip

stall lamp lights and drive quenches if the stall timer trips. The time depends on the current demand

terminal 10 TACHO

terminal 11

terminal 12

terminal 13

terminal 14

terminal 15

terminal 16

terminal 17

terminal 18

terminal 19

terminal 20

terminal 21

terminal 22

terminal 23

terminal 24

terminal 25

terminal 26

terminal 27

terminal 28

terminal 29

terminal 30

terminal 31

terminal 32

terminal 33

terminal 34

terminal 35

terminal 36

terminal 37

terminal 38

terminal 39

terminal 40

terminal 41

terminal 42

terminal 43

terminal 44

terminal 45

terminal 46

terminal 47

terminal 48

terminal 49

terminal 50

terminal 51

terminal 52

terminal 53

terminal 54

terminal 55

terminal 56

terminal 57

terminal 58

terminal 59

terminal 60

terminal 61

terminal 62

terminal 63

terminal 64

terminal 65

terminal 66

terminal 67

terminal 68

terminal 69

terminal 70

terminal 71

terminal 72

terminal 73

terminal 74

terminal 75

terminal 76

terminal 77

terminal 78

terminal 79

terminal 80

terminal 81

terminal 82

terminal 83

terminal 84

terminal 85

terminal 86

terminal 87

terminal 88

terminal 89

terminal 90

terminal 91

terminal 92

terminal 93

terminal 94

terminal 95

terminal 96

terminal 97

terminal 98

terminal 99

terminal 100

terminal 101

terminal 102

terminal 103

terminal 104

terminal 105

terminal 106

terminal 107

terminal 108

terminal 109

terminal 110

terminal 111

terminal 112

terminal 113

terminal 114

terminal 115

terminal 116

terminal 117

terminal 118

terminal 119

terminal 120

terminal 121

terminal 122

terminal 123

terminal 124

terminal 125

terminal 126

terminal 127

terminal 128

terminal 129

terminal 130

terminal 131

terminal 132

terminal 133

terminal 134

terminal 135

terminal 136

terminal 137

terminal 138

terminal 139

terminal 140

terminal 141

terminal 142

terminal 143

terminal 144

terminal 145

terminal 146

terminal 147

terminal 148

terminal 149

terminal 150

terminal 151

terminal 152

terminal 153

terminal 154

terminal 155

terminal 156

terminal 157

terminal 158

terminal 159

terminal 160

terminal 161

terminal 162

terminal 163

terminal 164

terminal 165

terminal 166

terminal 167

terminal 168

terminal 169

terminal 170

terminal 171

terminal 172

terminal 173

terminal 174

terminal 175

terminal 176

terminal 177

terminal 178

terminal 179

terminal 180

terminal 181

terminal 182

terminal 183

terminal 184

terminal 185

terminal 186

terminal 187

terminal 188

terminal 189

terminal 190

terminal 191

terminal 192

terminal 193

terminal 194

terminal 195

terminal 196

terminal 197

terminal 198

terminal 199

terminal 200

terminal 201

terminal 202

terminal 203

terminal 204

terminal 205

terminal 206

terminal 207

terminal 208

terminal 209

terminal 210

terminal 211

terminal 212

terminal 213

terminal 214

terminal 215

terminal 216

terminal 217

terminal 218

terminal 219

terminal 220

terminal 221

terminal 222

terminal 223

terminal 224

terminal 225

terminal 226

terminal 227

terminal 228

terminal 229

terminal 230

terminal 231

terminal 232

terminal 233

terminal 234

terminal 235

terminal 236

terminal 237

terminal 238

terminal 239

terminal 240

terminal 241

terminal 242

terminal 243

terminal 244

terminal 245

terminal 246

terminal 247

terminal 248

terminal 249

terminal 250

terminal 251

terminal 252

terminal 253

terminal 254

terminal 255

terminal 256

terminal 257

terminal 258

terminal 259

terminal 260

terminal 261

terminal 262

terminal 263

terminal 264

terminal 265

terminal 266

terminal 267

terminal 268

terminal 269

terminal 270

terminal 271

terminal 272

terminal 273

terminal 274

terminal 275

terminal 276

terminal 277

terminal 278

terminal 279

terminal 280

terminal 281

terminal 282

terminal 283

terminal 284

terminal 285

terminal 286

terminal 287

terminal 288

terminal 289

terminal 290

terminal 291

terminal 292

terminal 293

terminal 294

terminal 295

terminal 296

terminal 297

terminal 298

terminal 299

terminal 300

terminal 301

terminal 302

terminal 303

terminal 304

terminal 305

terminal 306

terminal 307

terminal 308

terminal 309

terminal 310

terminal 311

terminal 312

terminal 313

terminal 314

terminal 315

terminal 316

terminal 317

terminal 318

terminal 319

terminal 320

terminal 321

terminal 322

terminal 323

terminal 324

terminal 325

terminal 326

terminal 327

terminal 328

terminal 329

terminal 330

terminal 331

terminal 332

terminal 333

terminal 334

terminal 335

terminal 336

terminal 337

terminal 338

terminal 339

terminal 340

terminal 341

terminal 342

terminal 343

terminal 344

terminal 345

terminal 346

terminal 347

terminal 348

terminal 349

terminal 350

terminal 351

terminal 352

terminal 353

terminal 354

terminal 355

terminal 356

terminal 357

terminal 358

terminal 359

terminal 360

terminal 361

terminal 362

terminal 363

terminal 364

terminal 365

terminal 366

terminal 367

terminal 368

terminal 369

terminal 370

terminal 371

terminal 372

terminal 373

terminal 374

terminal 375

terminal 376

terminal 377

terminal 378

terminal 379

terminal 380

terminal 381

terminal 382

terminal 383

terminal 384

terminal 385

terminal 386

terminal 387

terminal 388

terminal 389

terminal 390

terminal 391

terminal 392

terminal 393

terminal 394

terminal 395

terminal 396

terminal 397

terminal 398

terminal 399

terminal 400

terminal 401

terminal 402

terminal 403

terminal 404

terminal 405

terminal 406

terminal 407

terminal 408

terminal 409

terminal 410

terminal 411

terminal 412

terminal 413

terminal 414

terminal 415

terminal 416

terminal 417

terminal 418

terminal 419

terminal 420

terminal 421

terminal 422

terminal 423

terminal 424

terminal 425

terminal 426

terminal 427

terminal 428

terminal 429

terminal 430

terminal 431

terminal 432

terminal 433

terminal 434

terminal 435

terminal 436

terminal 437

terminal 438

terminal 439

terminal 440

terminal 441

terminal 442

terminal 443

terminal 444

terminal 445

terminal 446

terminal 447

terminal 448

terminal 449

terminal 450

terminal 451

terminal 452

terminal 453

terminal 454

terminal 455

terminal 456

terminal 457

terminal 458

terminal 459

terminal 460

terminal 461

terminal 462

terminal 463

terminal 464

terminal 465

terminal 466

terminal 467

terminal 468

terminal 469

terminal 470

terminal 471

terminal 472

terminal 473

terminal 474

terminal 475

terminal 476

terminal 477

terminal 478

terminal 479

terminal 480

terminal 481

terminal 482

terminal 483

terminal 484

terminal 485

terminal 486

terminal 487

terminal 488

terminal 489

terminal 490

terminal 491

terminal 492

terminal 493

terminal 494

terminal 495

terminal 496

terminal 497

terminal 498

terminal 499

terminal 500

terminal 501

terminal 502

terminal 503

terminal 504

terminal 505

terminal 506

terminal 507

terminal 508

terminal 509

terminal 510

terminal 511

terminal 512

terminal 513

terminal 514

terminal 515

terminal 516

terminal 517

terminal 518

terminal 519

terminal 520

terminal 521

terminal 522

terminal 523

terminal 524

terminal 525

terminal 526

terminal 527

terminal 528

terminal 529

terminal 530

terminal 531

terminal 532

terminal 533

terminal 534

terminal 535

terminal 536

terminal 537

terminal 538

terminal 539

terminal 540

terminal 541

terminal 542

terminal 543

terminal 544

terminal 545

terminal 546

terminal 547

terminal 548

terminal 549

terminal 550

terminal 551

terminal 552

terminal 553

terminal 554

terminal 555

terminal 556

terminal 557

terminal 558

terminal 559

terminal 560

terminal 561

terminal 562

terminal 563

terminal 564

terminal 565

terminal 566

terminal 567

terminal 568

terminal 569

terminal 570

terminal 571

terminal 572

terminal 573

terminal 574

terminal 575

terminal 576

terminal 577

terminal 578

terminal 579

terminal 580

terminal 581

terminal 582

terminal 583

terminal 584

terminal 585

terminal 586

terminal 587

terminal 588

terminal 589

terminal 590

terminal 591

terminal 592

terminal 593

terminal 594

terminal 595

terminal 596

terminal 597

terminal 598

terminal 599

terminal 600

terminal 601

terminal 602

terminal 603

terminal 604

terminal 605

terminal 606

terminal 607

terminal 608

terminal 609

terminal 610

terminal 611

terminal 612

terminal 613

terminal 614

terminal 615

terminal 616

terminal 617

terminal 618

terminal 619

terminal 620

terminal 621

terminal 622

terminal 623

terminal 624

terminal 625

terminal 626

terminal 627

terminal 628

terminal 629

terminal 630

terminal 631

terminal 632

terminal 633

terminal 634

terminal 635

terminal 636

terminal 637

terminal 638

terminal 639

terminal 640

terminal 641

terminal 642

terminal 643

terminal 644

terminal 645

terminal 646

terminal 647

terminal 648

terminal 649

terminal 650

terminal 651

terminal 652

terminal 653

terminal 654

terminal 655

terminal 656

terminal 657

terminal 658

terminal 659

terminal 660

terminal 661

terminal 662

terminal 663

terminal 664

terminal 665

terminal 666

terminal 667

terminal 668

terminal 669

terminal 670

terminal 671

terminal 672

terminal 673

terminal 674

terminal 675

terminal 676

terminal 677

terminal 678

terminal 679

terminal 680

terminal 681

terminal 682

terminal 683

terminal 684

terminal 685

terminal 686

terminal 687

terminal 688

terminal 689

terminal 690

terminal 691

terminal 692

terminal 693

terminal 694

terminal 695

terminal 696

terminal 697

terminal 698

terminal 699

terminal 700

terminal 701

terminal 702

terminal 703

terminal 704

terminal 705

terminal 706

terminal 707

terminal 708

terminal 709

terminal 710

terminal 711

terminal 712

terminal 713

terminal 714

terminal 715

terminal 716

terminal 717

terminal 718

terminal 719

terminal 720

terminal 721

terminal 722

terminal 723

terminal 724

terminal 725

terminal 726

terminal 727

terminal 728

terminal 729

terminal 730

terminal 731

terminal 732

terminal 733

terminal 734

terminal 735

terminal 736

terminal 737

terminal 738

terminal 739

terminal 740

terminal 741

terminal 742

terminal 743

terminal 744

terminal 745

terminal 746

terminal 747

terminal 748

terminal 749

terminal 750

terminal 751

terminal 752

terminal 753

terminal 754

terminal 755

terminal 756

terminal 757

terminal 758

terminal 759

terminal 760

terminal 761

terminal 762

terminal 763

terminal 764

terminal 765

terminal 766

terminal 767

terminal 768

terminal 769

terminal 770

terminal 771

terminal 772

terminal 773

terminal 774

terminal 775

terminal 776

terminal 777

terminal 778

terminal 779

terminal 780

terminal 781

terminal 782

terminal 783

terminal 784

terminal 785

terminal 786

terminal 787

terminal 788

terminal 789

terminal 790

terminal 791

terminal 792

terminal 793

terminal 794

terminal 795

terminal 796

terminal 797

terminal 798

terminal 799

terminal 800

terminal 801

terminal 802

terminal 803

terminal 804

terminal 805

terminal 806

terminal 807

terminal 808

terminal 809

terminal 810

terminal 811

terminal 812

terminal 813

terminal 814

terminal 815

terminal 816

terminal 817

terminal 818

terminal 819

terminal 820

terminal 821

terminal 822

terminal 823

terminal 824

terminal 825

terminal 826

terminal 827

terminal 828

terminal 829

terminal 830

terminal 831

terminal 832

terminal 833

terminal 834

terminal 835

terminal 836

terminal 837

terminal 838

terminal 839

terminal 840

terminal 841

terminal 842

terminal 843

terminal 844

terminal 845

terminal 846

terminal 847

terminal 848

terminal 849

terminal 850

terminal 851

terminal 852

terminal 853

terminal 854

terminal 855

terminal 856

terminal 857

terminal 858

terminal 859

terminal 860

terminal 861

terminal 862

terminal 863

terminal 864

terminal 865

terminal 866

terminal 867

terminal 868

terminal 869

terminal 870

terminal 871

terminal 872

terminal 873

terminal 874

terminal 875

terminal 876

terminal 877

terminal 878

terminal 879

terminal 880

terminal 881

terminal 882

terminal 883

terminal 884

terminal 885

terminal 886

terminal 887

terminal 888

terminal 889

terminal 890

terminal 891

terminal 892

terminal 893

terminal 894

terminal 895

terminal 896

terminal 897

terminal 898

terminal 899

terminal 900

terminal 901

terminal 902

terminal 903

terminal 904

terminal 905

terminal 906

terminal 907

terminal 908

terminal 909

terminal 910

terminal 911

terminal 912

terminal 913

terminal 914

terminal 915

terminal 916

terminal 917

terminal 918

terminal 919

terminal 920

terminal 921

terminal 922

terminal 923

terminal 924

terminal 925

terminal 926

terminal 927

terminal 928

terminal 929

terminal 930

terminal 931

terminal 932

terminal 933

terminal 934

terminal 935

terminal 936

terminal 937

terminal 938

terminal 939

terminal 940

terminal 941

terminal 942

terminal 943

terminal 944

terminal 945

terminal 946

terminal 947

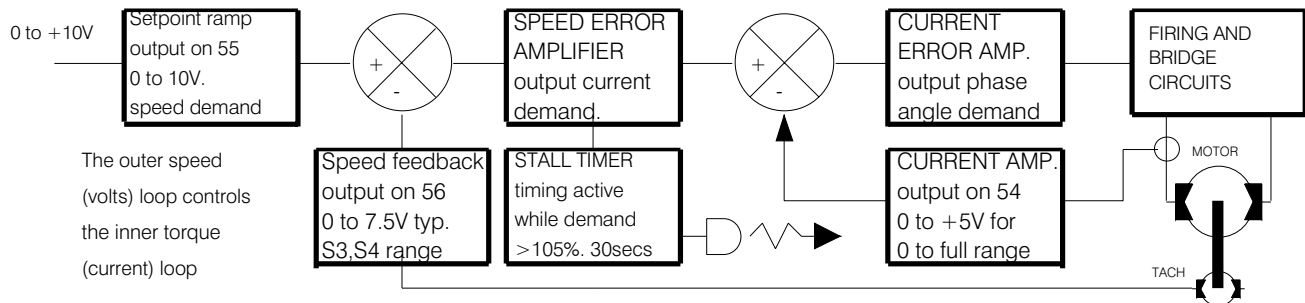
terminal 948

terminal 949

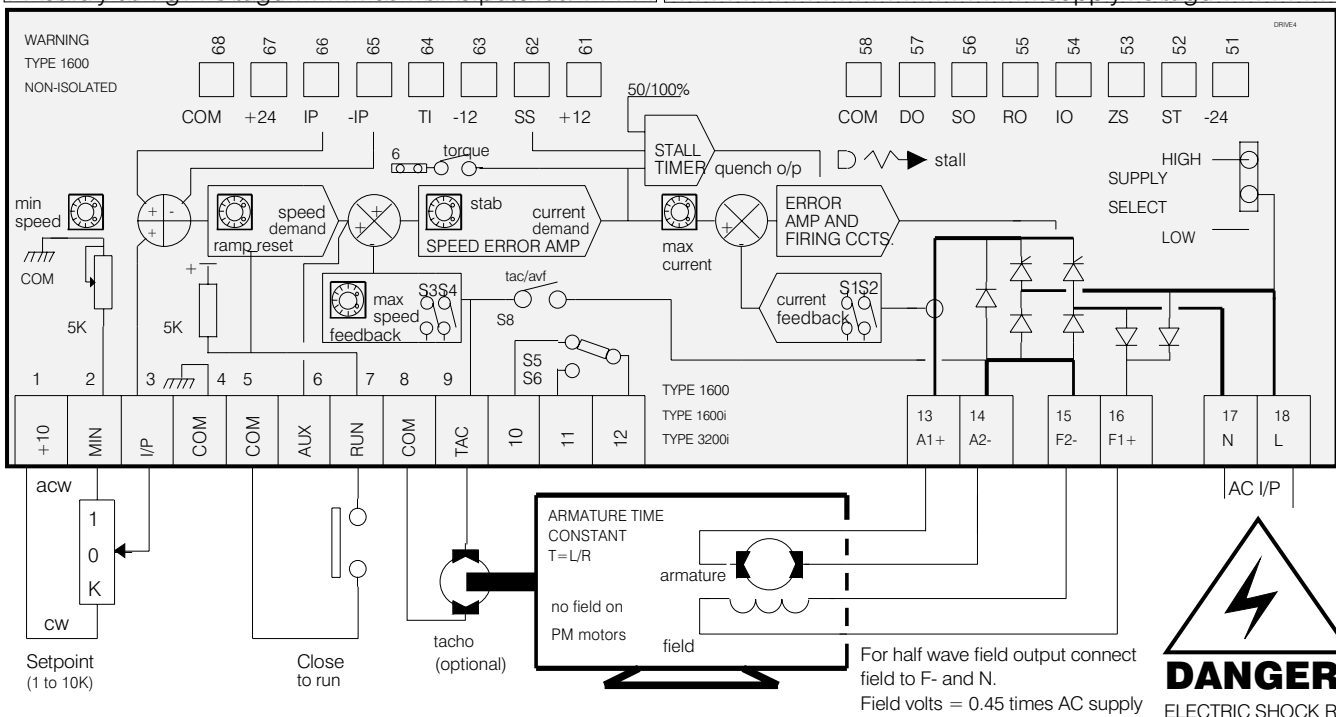
terminal 95

TROUBLE SHOOTING.

The drive consists of 2 high accuracy feedback control loops.



- | | | | |
|--|--|--|--|
| <p>1 The 1600 unit is NON isolated. DO NOT connect the electronics to earth or other non-isolated voltage.</p> <p>2 If you need to connect to other instruments, eg panel meter. Ensure that the instrument can float safely at high voltage</p> | <p>3 For systems involving connection to other controllers, you must use isolated drive models 1600i or 3200i</p> <p>4 Remember, all the wires, pots, contacts etc. that are connected to the terminals will be floating at mains potential.</p> | <p>5 STALL problems shown by stall lamp coming on after running are caused by the drive unit not able to give set speed</p> <p>6 Typical STALL reasons.
a) MAX CURRENT preset not correctly set, hence insufficient torque</p> | <p>7 Motor not powerful enough for application. Speed calibration set beyond capability of supply.</p> <p>8 Any factor which prevents motor from rotating at set speed, eg. jammed load, low supply voltage.</p> |
|--|--|--|--|



- | | | | |
|---|---|---|--|
| <p>9 Pot wired with T2 and T1 transposed. Motor slows down instead of speeding up</p> <p>10 Pot wired with T2 and T3 transposed. Motor slows down for clockwise rotation. T1 may be shorted to T2.</p> <p>11 Pot wired with T1 and T3 transposed. Motor slows down for anti-clockwise rotation. T1 becomes shorted to T2.</p> | <p>12 Loose or intermittent tacho coupling causes instability or overspeeding. Make sure coupling is secure and non-elastic</p> <p>13 Incorrect feedback scaling causes over or underspeeding. Calculate the desired max. tacho volts, adjust S3, S4</p> <p>14 Tacho failure. Until a replacement is obtained change to AV feedback S8. Rescale with S3, S4</p> | <p>15 Armature resistance should normally be a few ohms. The armature time constant must be greater than 10msecs</p> <p>16 Shorted turn on motor armature can cause power device failure. Check resistance through 360 deg rotation</p> <p>17 Brushes should be in good condition, correctly seated, and free to move in brush boxes.</p> | <p>18 Field resistance should normally be a few hundred ohms. The field must be isolated from earth and the armature</p> <p>19 Do not open circuit the field. Do not open circuit the armature unless RUN is opened first.</p> <p>20 The AC supply must lie within the limits specified on page 8. Ensure the selection jumper is correct.</p> |
|---|---|---|--|

SPECIFICATION

FUNCTION	SPECIFICATION	COMMENTS																		
CONTROL ACTION FEEDBACK METHOD 0-100% REGULATION MAX TORQUE SPEED RANGE OVERLOAD	DUAL LOOP PROPORTIONAL + INTEGRAL ARMATURE VOLTS 2% TYPICAL 20 : 1 150% CONTINUOUS CURRENT FOR 30 seconds.	TACHOMETER 0.1% TYPICAL 100 : 1																		
		SWITCH SELECT BEWARE MOTOR HEAT AT LOW SPEED																		
<u>CUSTOMER PRESETS</u> MAX SPEED MIN SPEED UP/DOWN RAMPS STABILITY IR COMPENSATION MAX CURRENT	25V - 400V FULL SCALE FEEDBACK 0-30% OF MAX SPEED INDEPENDANTLY ADJUSTABLE 1-30secs VARIES SPEED LOOP GAIN 0-30% OF ARMATURE VOLTAGE LINEAR SETTING FROM 0-100%, 4 SWITCHED RANGES	SWITCH SELECT NON-INTERACTIVE LINEAR RAMPS DO NOT USE WITH TACHO 150% OVERLOAD																		
<u>SWITCH SELECTABLE</u> CURRENT RANGE SPEED RANGE RELAY FUNCTION POWER UP HOLD TACHO/AVF	FOUR RANGES OF ARMATURE CURRENT FOUR RANGES OF FEEDBACK VOLTAGE DRIVE STALL OR ZERO SPEED RELAY POWER UP IN STALL OR RUN MODE SELECT TACHO OR ARMATURE VOLTAGE FEEDBACK	S1, S2 S3, S4 S5, S6 S7 S8																		
<u>JUMPER FUNCTIONS</u> TORQUE MODE SUPPLY SELECT	0-10V INPUT FOR 0-100% CURRENT WITH AUTOMATIC OVERSPEED PROTECTION. DUAL SUPPLY VOLTAGE SELECTOR	JUMPER SELECTED																		
<u>LINK FUNCTIONS</u> 4-20mA OR 0 -20mA LOOP 50% STALL LEVEL	ALLOWS CURRENT LOOP SIGNAL INPUT FOR SPEED ALLOWS LARGE PEAK CURRENTS	5V COMPLIANCE 150% PEAK																		
SUPPLY RANGES 45HZ TO 65HZ AUTO RANGING	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td></td> <td>LV30</td> <td>LV60</td> <td>110</td> <td>240</td> <td>415</td> </tr> <tr> <td>MAX</td> <td>36V</td> <td>72V</td> <td>130V</td> <td>264V</td> <td>440V</td> </tr> <tr> <td>MIN</td> <td>27V</td> <td>54V</td> <td>100V</td> <td>200V</td> <td>360V</td> </tr> </table>		LV30	LV60	110	240	415	MAX	36V	72V	130V	264V	440V	MIN	27V	54V	100V	200V	360V	OVER FULL TEMP RANGE WITH OUTPUTS LOADED
	LV30	LV60	110	240	415															
MAX	36V	72V	130V	264V	440V															
MIN	27V	54V	100V	200V	360V															
AC POWER UP RESET RUN LINE SIGNAL OUTPUTS SIGNAL INPUTS RELAY OUTPUTS RELAY DRIVERS RAIL OUTPUTS	MINIMUM OFF TIME BEFORE RE-SUPPLY 60mS ON, 20mS OFF. ALWAYS USE A RUN CONTACT TO ENABLE THE DRIVE AFTER THE APPLICATION OF AC SPEED, CURRENT, RAMP, DEMAND 3 SPEED INPUTS +/- RAMPED, DIRECT, ALL SUMMING STALL OR ZERO SPEED RELAY STALL, ZERO SPEED OPEN COLLECTOR PNP -24V UNREGULATED 25mA +12V, +10V, -12V REGULATED 10mA	500mS ALL BUFFERED PROTECTED VOLT FREE CHANGEOVER FOR -24V DC 100mA MAX +/- 20% 0.01%/DEG C 5%																		
FIELD OUTPUT ALTITUDE HUMIDITY FORM FACTOR TEMPERATURE ARMATURE TIME CONSTANT MAX I ² FUSING (Amps ² Seconds)	0.9(0.45) TIMES AC SUPPLY. 1600/1600i 1Amp, 3200i 2Amp 3000 METRES MAX FOR FULL RATING 85% R.H AT 40 C, NON-CONDENSING TYPICAL 1.5 AT MAX. OUTPUT STORAGE AND OPERATING -10 to +50C MINIMUM 10mS. USE EXTRA ARMATURE CHOKE TO INCREASE 1600 =365, 1600i =365, 3200i 8/16/32 =570, 3200i 48 =4750	FULL(0.9) or HALF WAVE(0.45) DERATE 1%/100M T = INDUCTANCE/RESISTANCE SEMICONDUCTOR FUSES REFER TO SUPPLIER																		

SPRINT ELECTRIC

Sprint Electric Limited

Ford, Arundel, West Sussex
UK

email info@sprint-electric.com
www.sprint-electric.com