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ARC FLASH HAZARD ASSESSMENT RESULTS STAGE 1 OR 2 ASSESSMENT

*** *SWITCHBOARD NAME*

ASSESSED AS CAT 0 OR CAT 1 USING THE SHORT–HAND METHOD
DS29 VERSION *, REVISION *, TABLE *
ROW NUMBER : *
SWITCHBOARD SUPPLIED FROM : ***kVA TRANSFORMER
CAT PPE : CAT **AS SHOWN IN COLUMN * OF TABLE 8A OR 9A*

FOR MAIN SWITCHBOARD ASSESSED AS CAT 0 OR CAT 1 ALL ACTIVITIES USING SHORT–HAND METHOD

ARC FLASH HAZARD ASSESSMENT RESULTS STAGE 1 OR 2 ASSESSMENT

*** *SWITCHBOARD NAME*

ASSESSED AS CAT 0 OR CAT 1 USING THE SHORT–HAND METHOD
DS29 VERSION *, REVISION *, TABLE *
ROW NUMBER : *
SWITCHBOARD'S INCOMER PROTECTION : *
CAT PPE : CAT **AS SHOWN IN COLUMN * OF TABLE 8B OR 9B*

FOR DISTRIBUTION BOARD ASSESSED AS CAT 0 OR CAT 1 ALL ACTIVITIES USING SHORT–HAND METHOD

ARC FLASH HAZARD ASSESSMENT RESULTS STAGE 3 ASSESSMENT

*** *SWITCHBOARD NAME*

ASSESSED AS CAT 0 OR CAT 1 USING THE SHORT–HAND METHOD
DS29 VERSION *, REVISION *, CURVES OF CLAUSE 13.3 & 13.4
SWITCHBOARD SUPPLIED FROM : ***kVA TRANSFORMER
ARC FAULT CURRENT : ***kA
BREAKER OPENING TIME : ** SECONDS
ARC ENERGY : ** J/cm^2
CAT PPE : CAT *

FOR MAIN SWITCHBOARD ASSESSED AS CAT 0 OR CAT 1 ALL ACTIVITIES USING SHORT–HAND METHOD STAGE 3 ASSESMENT

ARC FLASH HAZARD ASSESSMENT RESULTS CALCULATION ASSESSMENT

*** *SWITCHBOARD NAME*

ASSESSED USING CALCULATION METHOD DS29, VERSION * REVISION *				
ACTIVITY	MINIMUM PPE CATEGORY		DATE Mm YYYY	
	DOOR OPEN	DOOR CLOSED		
INCOMER			INCOMER ENERGY	
Racking	CAT *	CAT *	Incident Energy @ 455 mm	*** cal/cm^2
Switching	CAT *	CAT *	Arc Flash Boundary Whilst Switching	*** m clear space
			Incomer Insulated – Risk Assessed	
NON–INCOMER CIRCUITS			BUSBAR ENERGY	
Switching or Racking	CAT *	CAT *	Incident Energy @ 455 mm	*** cal/cm^2
Live Electrical testing (Power Circuits)	CAT *	CAT *	Arc Flash Boundary Whilst Switching	*** m clear space
Operating Controls	CAT *	CAT *		
Visual Inspection (Live Parts)	CAT *	CAT *		

FOR ALL SWITCHBOARDS NOT ASSESSED BY THE SHORT–HAND METHOD

ARC FLASH HAZARD ASSESSMENT RESULTS CALCULATION ASSESSMENT FOR GENERATOR SET SUPPLY

*** *SWITCHBOARD NAME*

ASSESSED USING CALCULATION METHOD DS29, VERSION * REVISION *				
ACTIVITY	MINIMUM PPE CATEGORY		DATE Mm YYYY	
	DOOR OPEN	DOOR CLOSED		
INCOMER			INCOMER ENERGY	
Racking	CAT *	CAT *	Incident Energy @ 455 mm	*** cal/cm^2
Switching	CAT *	CAT *	Arc Flash Boundary Whilst Switching	*** m clear space
			Incomer Insulated – Risk Assessed	
NON–INCOMER CIRCUITS			BUSBAR ENERGY	
Switching or Racking	CAT *	CAT *	Incident Energy @ 455 mm	*** cal/cm^2
Live Electrical testing (Power Circuits)	CAT *	CAT *	Arc Flash Boundary Whilst Switching	*** m clear space
Operating Controls	CAT *	CAT *		
Visual Inspection (Live Parts)	CAT *	CAT *		

FOR ALL SWITCHBOARDS NOT ASSESSED BY THE SHORT–HAND METHOD

ELECTRONIC SOFT STARTER MOTOR PROTECTION DESIGN

1. *MOTOR OVERLOAD FUNCTIONS WITHIN THE ELECTRONIC SOFT STARTER ARE CONTROLLED BY THREE PARAMETERS, ELECTRICAL DESIGN ENGINEER TO OBTAIN PARAMETER VALUES FROM THE MOTOR MANUFACTURER FOR INCLUSION IN ESS CONFIGURATION*
2. *ESS DEFAULT VALUES PROVIDE MOTOR PROTECTION TRIPPING CLASS 10 TO AS/NZS IEC 60947.4.1 : 2015. i.e. THE CLASS MAXIMUM DURATION IN SECONDS FOR A MOTOR WITH A MOTOR STARTING CURRENT OF 7.2 x Ir (Ir THERMAL SETTING ON MOTOR RATING PLATE)*
3. *FOR CLASS 5 PROTECTION SET PARAMETER 1–5, LOCKED ROTOR TIME TO 0.5 X SPECIFIED VALUE IF NON–STANDARD MOTOR PROTECTION CURVE REQUIRED, MODELLING WITHIN ELECTRICAL DESIGN SOFTWARE IS REQUIRED*

ESS PARAMETERS *(SEE DESIGN NOTE 3)*		
PARAMETER	DESCRIPTION	SETTING
1–4	LOCKED ROTOR TIME (DEFAULT 10s)	**:** MIN:SEC
1–5	LOCKED ROTOR CURRENT (DEFAULT 600%)	***%
1–6	MOTOR SERVICE FACTOR (DEFAULT 105%)	***%

VARIABLE SPEED CONTROLLER MOTOR PROTECTION DESIGN

1. *FOR ASYMETRICAL MOTOR APPLICATIONS THE MOTOR OVERLOAD FUNCTIONS WITHIN THE VARIABLE SPEED CONTROLLER ARE PROVIDED BY AN ELECTRONIC THERMAL LOAD CALCULATION FEATURE (ELECTRONIC THERMAL RELAY – ETR) THAT SIMULATES A BIMETAL RELAY BASED ON INTERNAL MEASUREMENTS AND CONFORMS WITH THERMAL OVERLOAD PROTECTION CLASS 10*
2. *FOR BORE PUMPING AND SEWAGE PUMPING APPLICATIONS, MOTOR PROTECTION TRIPPING CLASS 5 TO AS/NZS IEC 60947.4.1 : 2015 IS ACHIEVED BY ADDING AN EXTERNAL MOTOR PROTECTION RELAY AND THE ELECTRONIC THERMAL RELAY (ETR) IS REMAINS DEACTIVATED*

VSC PARAMETERS *(SEE DESIGN NOTE 3)*		
PARAMETER	DESCRIPTION	SETTING
1–90	MOTOR THERMAL PROTECTION (CLASS 10)	[4] ETR TRIP 1
	MOTOR THERMAL PROTECTION (CLASS 5)	[0] NO PROTECTION

DESIGN NOTES

1. *ASTERISKS IN ITEMS INDICATE A VARIABLE VALUE DEPENDENT UPON THE PARTICULAR INSTALLATION. THESE VALUES NOMINATED BY THE ELECTRICAL DESIGN ENGINEER*
2. *REFER MN01–30 SERIES FOR EXAMPLES OF PROJECT ELECTRICAL PRIMARY DESIGN DRAWINGS*
3. *WHERE ELECTRONIC SOFT STARTER OR VARIABLE SPEED CONTROLLER WITH IN–BUILT MOTOR PROTECTION IS USED, MOTOR PROTECTION CURVES NOT TO BE SHOWN ON GRAPH.*

ISSUE	DATE	GRID	REVISION	DRN	REC	APPD
B	12/2021		ESS AND VSC MOTOR OVERLOAD PROTECTION DESIGN NOTES AND TABLES ADDED ADDED. DESIGN NOTE 3 ADDED	PH	TK	EG EC

DESIGN SURVEY NONE | VERTICAL DATUM NONE | COORDINATE SYS NONE | ASCON SURVEY NONE | DES REF | DES CALC T LIU | DES CHD E GLIWSKI | DRN P HARVEY | Q.C. CHD S MEMORY | NORTH POINT

SUBMITTED 29/11/2019 T LIU (SIGNED) SENIOR ENGINEER – ELECTRICAL
RECOMMENDED 29/11/2019 E GLIWSKI (SIGNED) PRINCIPAL ENGINEER – ELECTRICAL
APPROVED 28/11/2019 N JOHNSON (SIGNED) SNR PRINCIPAL ENGINEER – ELECT

ENGINEERING

WATER CORPORATION

ELECTRICAL STANDARD SWITCHBOARD DESIGNS
SMALL PUMP STATIONS
PRIMARY DESIGN – PROTECTION GRADING TEMPLATE
PROTECTION GRADING CURVES – PART 2

FILE | PLAN MN01–3–1.2 | CAD | ISSUE B | ORIGINAL SHEET SIZE A1
PROJECT | MF

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